

LETTERS

CONCERNING

THE DISEASES

OF THE

URETHRA.

Translated from the French of M. J. L. ALLEGRE, M.D., of
 Lyons, by J. H. WELLS, M.D., of Boston.

BY CHARLES BELL.

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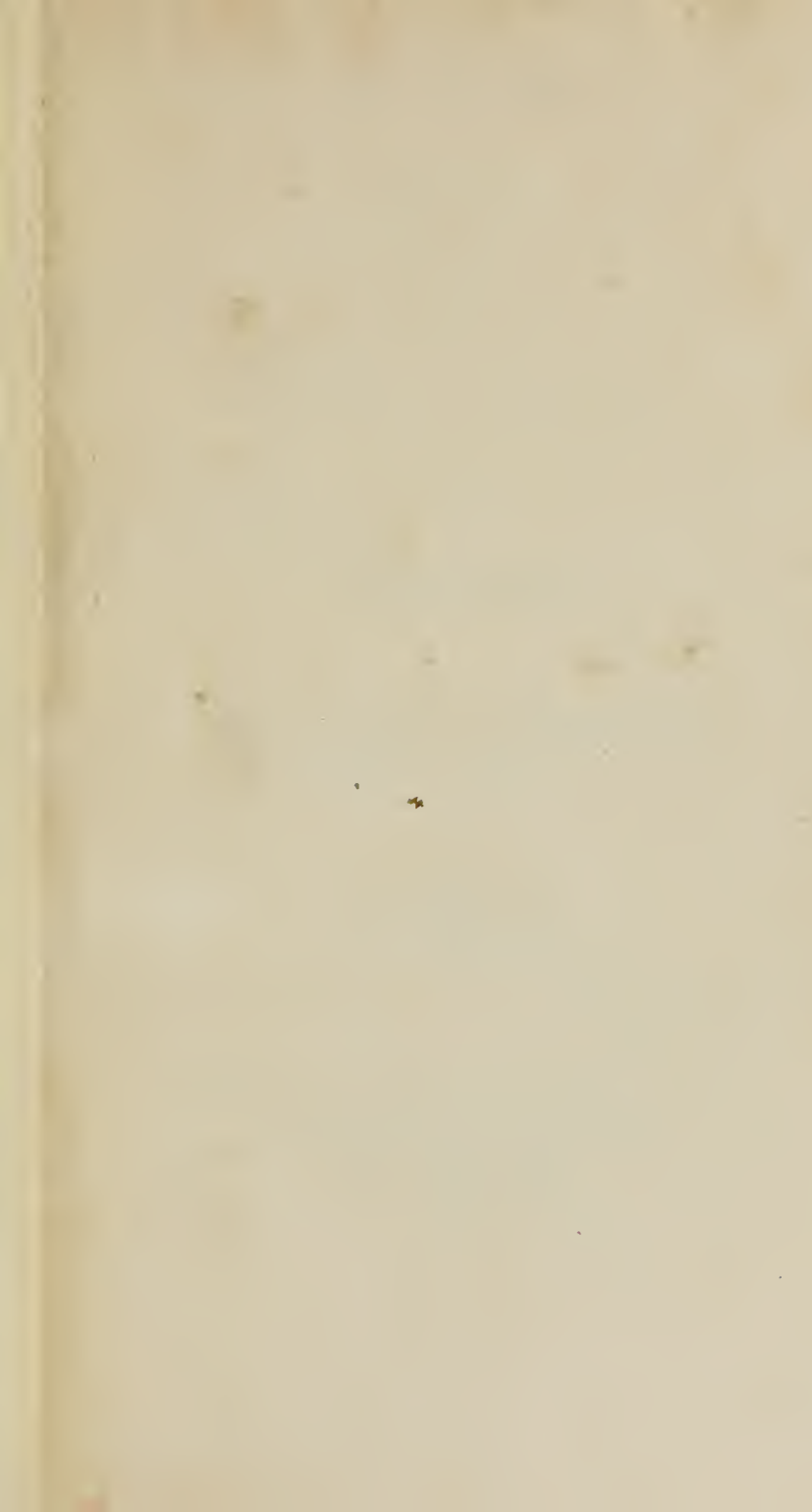
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LETTERS

CONCERNING

THE DISEASES

OF THE

URETHRA.

Verisimile est autem, id a quoque prætermissum quod ipse non cognoverat :
a nullo id quod non viderat, fictum. *Celsus.*

==
BY CHARLES BELL.
==

PUBLISHED BY W. WELLS AND T. B. WAIT & CO. BOSTON;
AND EDWARD EARLE & CO. PHILADELPHIA.

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NOTE.

I HAVE no other apology to offer for this publication than the hope of informing some part of the profession of facts regarding the diseases of the Urethra, which I believe to be of the first importance in practice. The knowledge of these I have attained very slowly, and after repeated disappointments ; for, at first, I too implicitly believed that all the information necessary to practise was already before the public. The impossibility of reconciling circumstances which presented themselves, during the treatment of these diseases, with published opinions, and the method of cure generally adopted, made it necessary for me to disregard authority, and have recourse

NOTE.

to anatomy as the surest guide. I am aware of the common opinion, that nothing new can be said upon the subject of stricture in the urethra. This only proves to me that these observations come before the public in circumstances peculiarly disadvantageous. But it is certain that, of many excellent surgeons in the metropolis, with whom I am acquainted, there are not two of them prosecuting the same plan of cure in diseases of the urethra; and many in the country believe that they are following an established method, when they are in truth doing outrage to every principle deducible from the structure and the morbid appearance of the parts concerned.

In the following tracts, I have conducted all my inquiries upon grounds ascertained by anatomical investigation. I have brought forward facts which cannot be questioned;

NOTE.

and on these facts I trust that I have reasoned candidly. I trust also that I have shewn every where that respect, which I sincerely feel, for those whose opinions I have had occasion to criticise, and without whose previous labours mine could have been of little avail.

These tracts are presented in the form of letters, as they were originally written. The license of that sort of writing may be my apology for defects of style ; and this manner of explaining professional subjects approaches more nearly to the nature of discourse, to which, as a teacher, I have been accustomed.



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LETTERS
CONCERNING
THE DISEASES OF THE URETHRA.

LETTER I.

Concerning the varieties of Stricture in the Urethra as discoverable on dissection, and the means of distinguishing these varieties in the living body ; with practical inferences concerning the method of cure.

1. **T**HERE is a great inconsistency in following the same method of cure, in all strictures of the urethra, when it is demonstrable that there are many varieties in this disease. Unfortunately when Mr. Hunter discovered, by dissection, the existence of stricture, he entertained an ingenious, but false, idea regarding the cause of the disease. He conceived that the membrane of the urethra was muscular ; and that a fibre,

or a fasciculus of the fibres, of this muscle, being contracted, in an inordinate degree, or permanently, was the cause of stricture. He described a stricture as resembling in effect a thread tied round the membrane of the canal. Although sometimes a stricture has this appearance, it is a description very imperfect of that stricture which Mr. Hunter has represented in his valuable work. I have now, completely to my own satisfaction, established that the urethra is not muscular; and that inflammation is the cause of stricture.* And as in every other case of inflammation by which permanent derangement is produced, there is a very considerable variety in the consequences; so in the urethra there are certain important distinctions to be observed in the effects of inflammation, both respect-

* This subject is discussed in the Second Letter on Spasmodic Stricture.

ing the *nature* of the callosity or stricture, and respecting the *extent*. Besides the varieties of stricture discoverable on dissection, there are some other important circumstances which appear to me not yet to be before the profession; and on which depends the efficacy or safety of the remedies to be used in diseases of the urethra.

2. I will not deny that stricture has very Simple stricture. often the appearance described by Mr. Hunter, as if a thread were tied round the urethra; and as if there were a membrane tucked, and hanging across the canal. In introducing the bougie, or probe, we feel the point start over the stricture so as to convey to us precisely this notion. This simplest form of stricture I have examined, first by dissection, and also in preparations. When a stricture of this kind is of long standing, and has no inflammation or coagulable lymph around it, there is

seen in the substance, or on the surface, of the membrane of the urethra, a pure white dense fibre. This small fibre is distinguished from the soft mucous and dilatable membrane of the urethra, by its resemblance to such filaments as form the texture of the common fascia. The term *bride** of the French authors must have been applied to this appearance. I have observed that the direction of the fibre is not always in the circle of the canal, but often it splits and branches, and sometimes runs nearly longitudinally. Similar effects to this are seen in other membranes to be the effect of inflammation, particularly in the peritoneum.

When this stricture is newly formed, and the inflammation continues, there is around the firm line of the stricture a thickened base ; this remark, however, is made only

* See La Faye's notes on Dionis.

from the sensation communicated in the examination of the living.

If inflammation occurs as a consequence of this stricture, the stricture itself not only increases, but the passage is apt to be further choaked by a crust of coagulable lymph which forms behind. Through this crust, as it is forming, the urine makes its way, and forms a hole corresponding with the stricture. Indeed I have proofs before me that the new membrane will become consolidated, apparently by successive attacks of inflammation behind the stricture, and, at last, will form of this simple stricture one more irregular. (See further what is said, in the explanation of the plates.)

3. Much has been said formerly of stricture in the urethra being the effect of ulcer; and in truth a cicatrix.* When Mr. Hunter proved that a purulent discharge

Ulcerated
stricture.

* Dionis and Saviard, and others.

might come from a surface inflamed, though not ulcerated ; and that in gonorrhœa there is no ulceration of the urethra, the question was held to be put to rest. Gonorrhœa was not imagined to be the cause of stricture. Stricture was supposed to proceed from muscular contraction, and the connection between the original disease and its consequences was almost forgot. Stricture, though occasioned by inflammation, will yet be produced without ulceration. But I cannot shut my eyes against the fact presented to me by dissection. I have found a firm stricture, in the centre of which there was an excavation by ulceration : and we must conclude that either the stricture must have ulcerated, or the original ulcer must have hardened, so as to condense the surrounding cellular membrane, and produce a very firm cicatrix and consequent stricture.

4. A narrowness of the canal, obstructing the point of the bougie, and giving, on examination, in the living body, the exact feeling of a common stricture, frequently proceeds from an inflamed lacuna. More general inflammation of the membrane of the canal may have subsided, but still the patient will be able to squeeze out a little thick purulent matter. From there being no active disease of the urethra, the surgeon will naturally think of introducing a bougie, and the point of it may suddenly be obstructed, so as to give the idea that there is a full circular contraction of the canal. We may often ascertain the nature of this case by examining with the finger on the outside. We feel a small hard body like a seed, or pea, within, or rather attached to, the canal.* When this part is

Stricture
from in-
flamed la-
cunæ.

* I imagine that this circumstance gave rise to the opinion which Arneau and Petit supported, that the disorder attributed to the caruncle arose from a tumor in the spongy substance of the urethra.

pressed, a little purulent matter may be pushed to the point of the urethra. If a soft bougie is introduced, in order to take the impression of the stricture, a flatness will be perceptible on one side of the bougie. If a small bougie, or probe, be introduced, its point may be made to hitch or lodge in the little sac or follicle.

One of the common lacunæ of the urethra, provided for the secretion and lodgement of the mucus, which is sent before the urine for lubricating the canal, has become the seat of gonorrhœa, or of that chronic inflammation which succeeds to it; while the inner surface of the lacuna has assumed the suppurative action, the surrounding membrane has become condensed, so as to lose its elasticity, and the canal of the urethra is consequently incapable of dilatation at that part.

5. The idea of seeing a stricture of the urethra is somewhat ludicrous ; but the fact is, that there is a stricture of a very obstinate nature which forms just within the lips of the urethra. I have seen it of a gray or ash colour, and hard as cartilage. If I mistake not, Mr. Home gives cases of this where the caustic was employed with success. I have used both caustics on this kind of stricture. A friend of mine ventured to apply the caustic here, because, seeing the disease, he thought he might risk the application of the caustic in the common way. But it produced great distress, and no ultimate benefit. In consultations, I have been persuaded to cut it, and have accordingly made two transverse incisions upon it. I have dilated it, by making the patient wear a small tube in the urethra, so that what had been a stricture came to be in truth the widest part of the canal. In

Stricture near the orifice of the urethra, and visible.

short, in this case, as in many others, we have attempted to do too much.

Dilatable
stricture.

6. There is no case in which the surgeon is more apt to be confounded, than when a patient comes to him with a stricture which easily yields to the pressure of the bougie. He finds that there is, at first, a distinct resistance to the point of the bougie, but that the stricture is not firm, nor the sides of the canal callous. He finds that although at first he has difficulty, yet by introducing a succession of bougies he is able to pass the largest bougie with ease, and the contraction seems to be destroyed. But although the patient sees a large bougie introduced into his urethra, and cannot persist in saying that he has a stricture, he allows himself to be persuaded in opposition to his feelings; for his uneasiness continues, and, after a few days, he returns in his former condition. This subject of dila-

table stricture I have thought it necessary to discuss more at length in the next letter.

7. All strictures are attended with symptoms which would incline us to believe that they are liable to spasmodic contraction. But the profession seems to entertain an opinion that there is a stricture more highly irritable, and in which the capacity for muscular action continues: that this muscular stricture, contracting in a degree, produces difficulty in passing the urine; and that the contraction is occasionally, in a much higher degree, producing total obstruction. As I deny that stricture ever arises from this muscular contraction, I, of course, cannot believe that there is such a thing as a stricture possessing muscular power. And, if I use the term spasmodic stricture, it is only as implying that stricture which is attended with inflammation; with high sensibility in its surface, or in the

Spasmodic
stricture.

neighbouring part of the canal ; and that this sensibility is attended with a morbid irritability of the surrounding muscles. The character of this stricture is, that the obstruction seems occasionally to give way ; that there is great pain and irritation on introducing the bougie into the stricture, with heat of urine, fulness of the perineum, and frequently total obstruction for a time. The variations in the capacity of passing urine, while yet the stricture was of a hard and rigid nature, soon brought me to the conviction that the term spasmodic stricture, as generally used, was improper ; that there was no such thing as a muscular power in the stricture itself.

Of stricture, with stone in the urethra.

8. I have dissected the urethra where a sharp stone had stuck in it. The effect of this was to produce stricture. But although, during the life of the patient, the resistance of the urethra to the progress of the stone

forward was such (the case being mistaken) as to destroy him, it was difficult to preserve any thing of the appearance of stricture in the preparation. It was not a permanent stricture, but an immediate effect of the loss of elasticity in the inflamed canal and surrounding membrane. A little soaking in water removed all appearance of stricture in the dead parts.

A small stone formed in the bladder may be retained behind a stricture ; but we must also be aware that a small and rough stone passing along the urethra will inflame it, make it incapable of dilatation, and, in short, produce stricture. This stricture however it will be very possible to dilate rapidly by the use of the bougie, so as to permit the stone to be discharged by the impulse of the urine.

9. If the stone be retained in the urethra, and the urine allowed to flow past it, the

stone will cause the membrane of the urethra to ulcerate, and it will sink and bury itself in this ulcer, so that an instrument passed into the bladder will grate along the surface of the stone. I have found a great many stones lodging in the ducts of the prostate gland. I have also seen a stone of the size of a filbert buried in the substance of the prostate gland. These stones form in small particles, and, irritating, produce ulceration in the surrounding substance, and so the stone and its sac continue to enlarge. But there is a circumstance connected with this part of the morbid anatomy, which though I do not understand, yet I think it may eventually be of use to have it before you. In examining the urethra of a subject, I found that at the caput gallinaginis there was a hole, which from its appearance I should have said had been formed by the improper use

of a bougie ; but on following the canal I found it open into a smooth round sac. As this sac could not be formed by the operation of the bougie, it cannot be admitted that the perforation of the urethra was made by the surgeon.* In such sacs stones may be deposited by the lodgment of the urine.

10. Stricture is sometimes, as already observed, seated just within the mouth of the urethra ; more frequently about an inch and half down, and in the seat of the original inflammation of gonorrhœa, or where the penis takes a sudden curve in hanging from the pubes. And lastly, it is very often found near the bulb, either immediately

Place of
stricture
and of in-
flamma-
tion in the
urethra.

* In Dr. Donald Monro's "Observations on the Diseases of Soldiers," there is such an appearance described. Inflammation and abscess about the prostate is often mentioned in the authors quoted by Bonetus, which is an additional reason for attending to the subject. See also La Faye on Dionis. In practice, on introducing a bougie into the neck of the bladder, I have seen a copious discharge of matter follow the operation, and I suspect that it proceeds from such abscesses about the vesiculæ seminales as I have here described. When matter is thus discharged from the neck of the bladder, the anterior part of the canal is very irritable.

before the sinus of the urethra, or at the termination forwards of the membranous part of the canal.

When seated midway in the urethra, and at the part where the penis hangs down, the stricture often extends only to one half of the canal, which of course is the lower half. The cause of stricture being so frequent near the bulb is, that this is really the most sensible part of the whole canal. It possesses a peculiar sensibility, to govern the action of the muscles seated there, and this sensibility gives rise to inflammation and to morbid irritability of the surrounding muscles.

11. I have not had an opportunity of examining the urethra by dissection, where I was certain that there had been a recent gonorrhæa; but in the subjects of the dissecting room, I have seen inflammation of the urethra near the extremity of the penis

and inflammation also near the neck of the bladder and at the bulb, while there was no unusual appearance in the intermediate part of the canal. This fact, in combination with the circumstances of practice, induces me to believe that there is a direct consent betwixt the two extremities of the urethra, and that they sympathize in disease; that irritation in the fore part of the canal is quickly conveyed to the bulb and neck of the bladder, just as inflammation seated near the neck of the bladder will give the sensation of pain in the part of the urethra behind the glans.

12. I do not see any reason for rejecting the term callosity; the fact being that, both in dissection and in the examination of a patient, there is evidence of a considerable portion of the canal having become firm and almost of cartilaginous hardness.*

Of callosities and of double stricture.

* This state of the urethra is the *carnosity* of the older authors; see Wiseman.

The notion commonly entertained of these long strictures or callosities is, that there have been two strictures, and that, the intermediate portion of the canal being no longer distended with the urine, the channel has diminished. This is the explanation given by Mr. Home in his excellent treatise. But it does not accord with the circumstances. For example, I have lately examined the parts where the stricture had absolutely closed so that not a drop of urine passed along the urethra. The bladder had been punctured, and the man lived for years discharging his urine by the puncture. Here it was curious to observe that the part of the urethra, anterior to the total obstruction, was wide or dilatable as in the natural state of the parts. It is evident therefore, that the mere cessation of the usual distension of the urethra will not be followed by stricture or permanent contrac-

tion of the canal. These callosities, or long strictures, are always irregular; and this irregularity cannot be accounted for on the supposition that the canal at this part has become rigid for want of the usual distention of the urine. I entertain no doubt that these contractions of the urethra, which extend to a considerable length of the canal, are produced by more severe attacks of inflammation than those which produce the common stricture.* This sort

* In most of the older writers, we find a reference to Brunnerus; but it is strange that his sensible and evidently accurate observations did not more influence the general opinion, or, at least, overturn the fancy about caruncles. On one occasion, he gives an accurate account of this kind of stricture as it appears on dissection. "Incisa urethra, nulla excrescentia, aut caruncula apparuit, neque fungus, meatum urinæ obstruens, id quod oppidò mirabatur medicus adstans, qui sæpius viventi medebatur; sed mera angustia et coarctatio urethræ hinc inde visa fuit, qualis in vasis umbilicalibus post partem obtingere solet coalescentibus.".....J. C. BRUNNERUS *de Caruncula in Urethra, Acad. Cæsareo-Leopoldinæ Ephemer. Cent. I. Observ. LXXI. & Observ. XCVII.*

Many of the immediate successors of Brunnerus, with this before them, assert that they have themselves seen carunculæ in the urethra; but we find that where they have found them they have cured them also, and that consequently they have not seen them, but imagined them. *Boerhaave Plect. Acad. g. 209.*

of callosity of the canal differs from the more common stricture in this, that in consequence of the spongy body, which surrounds the canal of the urethra, often partaking of the effect of the inflammation, the cells are obliterated; and what was loose, spongy, and dilatable has become condensed and rigid. This undilatable condition of the urethra, when examined by the bougie, or probe, gives the sensation of great irregularity; the point is interrupted, and feels as if it were moving over eminences on alternate sides of the canal. When the ball probe, or urethra sound, is introduced through the anterior part of the stricture, there is difficulty in pushing it down, and a slight impediment is felt in retracting it.

13. It is in these callous strictures that the false passage is apt to be formed; and this wrong direction is as apt to be taken by the bougie simply as when the caustic

is applied. I dissected the parts, where I found an irregular stricture near the bulb of the urethra, and by the side of the stricture a passage of an inch and a half in length in the spongy substance of the urethra. This canal was smooth like the natural urethra. It was curious to find on inquiry that the patient had experienced relief by the introduction of the bougie into this false passage.

14. There is a state of the canal in which a considerable portion is diminished in width; and which does not fall under any of the foregoing distinctions. I have found, on dissection, from two to three inches of the canal much diminished in capacity, and rigid; and all around this part of the urethra the spongy substance obliterated.* The effect was, as if the urethra and spon-

Narrowness of the urethra attended with wasting of the spongy body.

* Morgagni found the urethra contracted a third part of its length.
III. XLII. 39.

gy body had suffered by compression ; yet this could not be the case, and at present I do not pretend to explain the cause. It may have been a remote consequence of inflammation, or an effect of old age when there was a cessation of the functions of the generative organs and a diminished power of the bladder. Yet as a part of the urethra behind this contracted portion of the canal was unusually dilated, and had the marks of former inflammation, this latter explanation is not so very satisfactory.*

Cense-
quences of
stricture,
as disco-
verable on
dissection.

15. Where there is stricture in the urethra, that portion of the canal which is betwixt the stricture in the urethra and the bladder is much enlarged. When the patient has died, in consequence of stricture and an acute attack of inflammation, I have

* On dissection, or in practice, I find nothing confirming the idea of a spongy swelling of the membranes of the urethra, similar to the state of the mucous membrane of the nose in Coryza. (See Petit and Arneau.) The idea has probably arisen from examining the dilatable stricture.

found the whole extent of the urethra in-
flamed, but chiefly that portion which lay
between the stricture and the bladder.
There a firm coat of coagulable lymph
was deposited, which hung fleecy into the
dilated cavity of the canal. Under this in-
flammatory crust, the proper surface of the
urethra was highly inflamed. In another
instance, where I was ignorant of the man-
ner of death, I saw behind the stricture a
patch of coagulable lymph, and conside-
rable inflammation around it; but in the
part of the urethra anterior to the stricture,
there were no marks remaining of inflam-
mation.

Urethra
inflamed.

In the instance of a gentleman, who re-
sisted all means of cure, and who died of
inflammation of the bladder, the coagulable
lymph formed a dense coat to the inside of
the urethra, behind the stricture, so as to

close the seminal ducts and mucous follicles.

Fistula.

16. I have also had an opportunity of observing the appearance of the urethra where a fistula had formed in the perinaeum, in consequence of stricture in the urethra. I had imagined that there would be formed only one rough ulcerated hole: but if this is the case in the beginning, in one instance at least it must have changed; for I have seen four holes, with strong bands interlaced, communicating betwixt the canal of the urethra and the cellular substance of the perinaeum. These holes were crowded in a small space behind the stricture; and, as far as I know, there is no instance of a fistulous opening forming in the urethra anterior to a stricture.

17. In examining the principal anatomical collections, both in London and in Scotland, I think it important to observe, that I

did not always find that connection between the degree of contraction of the stricture and the violence of the diseased action behind the stricture, which I had led myself to expect. In a stricture which would have been altogether neglected, had it not been for the diseased appearance independent of the contraction, I found the coagulable lymph deposited behind it. This preparation I saw in Mr. Fyfe's hands ; and the younger Dr. Monro shewed me a preparation where fistula had formed, and yet from appearance one should say that the passage of the canal must have been pretty free. On a former occasion I have said that the cure of fistula in perinæo is to be effected by the cure of stricture, implying that the mechanical obstruction was the cause of the fistula forming, and is the source of its continuing. This is so far correct. But from anatomi-

cal proofs, as well as from facts ascertained in practice, I should say that our attention ought, in an equal degree, to be turned to the state of sensibility and inflammation of that part of the canal which lies behind the stricture ; and that the inflammation and danger of fistula does not correspond with the degree of narrowness, but with the degree of irritation. This is a subject of so much importance, that I have entered upon the discussion somewhat more at large in the Third Letter.

Effects on
the pros-
tate gland.

On examining the prostate gland and urethra behind the stricture, I have seen great disorder. Before the irritation produces ulceration and fistula, cavities are formed in the sides of the canal where it passes through the prostate gland. These cavities I believe to be only enlargement of the natural ducts of the gland. I have seen them so large as to admit the end of

the largest bougie in size. Having observed that, in bad cases of fistula in perinæo, the urine came from the neck of the bladder and prostate gland, I am inclined to believe that these cavities in the side of the urethra and prostate gland sometimes ulcerate, and produce the worst kind of fistula, because they receive the urine direct from the bladder, uninterrupted by the action of the sphincter. The incessant infiltration of the urine into the cellular texture of the perinæum is probably the cause that in most cases of the kind which I have seen there was extensive mortification.

I have found in the neighbourhood of a stricture a very minute crop of soft warts growing from the membrane of the urethra.

18. On the bladder the effect of stricture is always manifest. If the difficulty of passing the urine has been long continued, the coats of the bladder are very much

Of the effects of stricture on the bladder.

thickened; apparently by frequent lesser degrees of inflammation, but principally from the necessity of increased force in throwing out the urine, and the consequent increase in strength of the muscular fibre. When the patient has been cut off by irritation more rapidly, I have found the fundus of the bladder, on the outside, loaded with blood, and black with a congeries of turgid vessels; on the inside, masses of coagulable lymph, and, in the interstices, the natural surface loaded with blood. If, by accession of inflammation in stricture, absolute obstruction comes suddenly, the bladder suffers an extraordinary degree of distension until the urine at last escapes into the cavity of the abdomen. On examining the fundus of the bladder, I have seen dark spots upon it, and in the centre of these dark spots small ragged holes. If the bladder had burst, it would have ap-

peared rent. It has happened that the bladder has been rent by a fall, and in that case the hand could be put through the rupture.* If it had gangrened, it would have been black over a greater extent, and inflamed like a gangrened intestine. But as there were more than one small hole, I conceive that the urine escapes from the fundus of the bladder, as it does from the urethra in the more common case of fistula in perinæo, that is, by ulceration. Sometimes, it would appear, the urine escapes from the bladder without the outer peritonæal coat giving way; then the urine insinuates itself extensively into the cellular substance behind the peritonæum. A case of this kind has been communicated to me.

19. I have seen the effects of a tube remaining for a long time after the operation of puncturing the bladder above the pubis.

* Medical Comm. vol. 2. Bonet. Sepulch. lib. iii, sect. 24, obs. 12.

The cellular membrane, which is naturally loose here, had been condensed so as to form a canal of great strength, and perfectly smooth on its inner surface. The bladder was thickened only to a moderate degree. I have examined the inside of the bladder after the operation of puncturing by the rectum. The hole in the bladder was exceedingly small, and had apparently been attended with very little inflammation. But in this instance the instrument had been withdrawn as soon as the urine was evacuated. After the catheter had been retained for some time in the bladder, I have found, upon dissection, that the back part of the bladder was inflamed and ulcerated, in consequence of the pressure of the end of the instrument.

On the
ureters.

20. The effect of stricture on the ureters is to enlarge them in a remarkable de-

gree. I have seen them as large as a small intestine, and much inflamed.

21. On the kidney, the effect of stricture, or any other kind of obstruction to the course of the urine, is very remarkable. On the kidney. It suffers great distension; the surrounding cellular membrane is inflamed; the substance of the kidney itself is inflamed; and the pelvis, with its digital processes, is greatly distended, and the vessels turgid with vermilion-coloured blood. The quantity of fat surrounding the kidney is sometimes unnaturally accumulated, if the irritation has continued long.

22. The effect of stricture on the bladder, ureters, and kidneys combined, brings On the brain. on fever, with great irritation, from which, at last, there results an effusion on the surface of the brain.

In a child, whose body I dissected, I found many spongy tumors growing from

the inside of the bladder, and much water in the ventricles of the brain, and under the arachnoid coat.

Effect of
caustic on
stricture.

23. The last fact I shall mention to be ascertained from the anatomical investigation of this subject regards the effect of caustic on stricture; which I believe few have had an opportunity of observing. In one application of the lunar caustic, an impression to the depth of an eighth part of an inch seemed to have been made. One application more would have admitted the largest bougie into the bladder. The caustic had been applied nine days before death. The parts were not in a state fit for observing the appearances of inflammation; but, when suspended in fluid, fleecy loose shreds were seen to hang from the ulcer produced by the caustic. There was no mucus or film of coagulable lymph cover-

Of lunar
caustic.

ing the sensible surface left by the operation of the caustic.

I applied the kali purum three times to ^{Of the alkali.} a narrow stricture of the simple kind: the patient was relieved of irritation; but dying of another disease, on the examination by dissection, the stricture bore no marks of erosion or even partial destruction. See Plate III. and IV.

These are the chief facts which I have been able to establish by the examination of the diseased parts after death. I give them as the ground-work for future observation; and I will, in the meanwhile, draw some conclusions in practice.

IF these distinctions in the nature of stricture, drawn from appearances in the dead body, are important, it is of course

equally necessary to learn to distinguish them in practice.

24. Besides the use of the common bougie and of the soft wax bougie, I have used what I would call the urethra sound.* It is by the use of these probes that I first became aware of the great variety in the forms of stricture, and of those essential circumstances to be observed in practice, which I have detailed in the succeeding letters. I allude more particularly to the exquisite sensibility of the canal at particular points, and especially behind the stricture.†

An objection has been made to this instrument, that it may be apt to be grasped

* The term ball probe has been so far misunderstood, that the instrument makers have had repeated orders for them to be used as probes for gun-shot wounds. It is so far well, however, that they will answer for gun-shot wounds, perhaps better than the gun-shot probe commonly used, and are well adapted for the examination of cavities or sinuses of any kind. See Plate II.

† For a particular account of the manner of using these probes, and of sounding the urethra, see "System of Operative Surgery founded on the Basis of Anatomy." Vol. I. p. 100.

by the membrane of the urethra. There is no foundation for this fear ; it has arisen from ignorance of the nature of the membrane of the urethra.

One evident advantage to be derived from the use of these probes is, that they do not produce that universal irritation along the whole canal of the urethra which we find to be the effect of introducing a bougie for the first time. The patient will often faint on introducing a bougie into his urethra before it is accustomed to the sensation. We cannot keep a common bougie long in the urethra, while it is in a sensible state, without exciting more inflammation, and imposing on the patient the necessity of submitting to considerable constraint afterwards. Often patients have begged me to introduce the sound before the bougie, to take off the unpleasant sensation. By the use of these probes we can

continue to examine the urethra minutely, without producing any mischief.

25. The common example of permanent stricture, particularly described under the term Simple Stricture,* is ascertained, in the living body, by the use of the soft bougie, and by the circumstance of the ball of the probe passing down uniformly, and without obstruction, till it reaches the stricture; there meeting with resistance at last, passing with a jerk through the stricture, and then gliding smoothly onwards. This stricture is to be cured by the operation of the caustic. A full sized armed bougie is to be passed down to it, so that the whole base of the stricture may be destroyed; after which the largest bougie may be carried freely into the bladder. This is the practice of Mr. Home; and what carries equal weight with me it is the

*See above page. 15.

practice of Mr. Lynn, the most enthusiastic of Mr. Hunter's pupils, and one who has retained his excellent precepts with the truest devotion. It is the success attending the operation of caustic, in cases similar to this, that has brought this method of cure into such general use. If the idea be taken up that a stricture is to be entirely eaten away by the operation of the caustic, it must be done thoroughly. For the small remains of a stricture, by impeding the course of the urine, will produce an excitement in the parts, and reproduce the stricture. I wish to state this distinctly, because what I have to say concerning other cases of stricture might be mistaken for a condemnation of this method of cure, so admirably adapted to the simple permanent stricture.

26. When there is an impediment to the passing of the point of the bougie, by the

inflammation of a lacuna, in the manner I have already described, the application of the lunar caustic, according to Mr. Home's method, would be improperly severe, and perhaps not very effectual, unless, by dissolving, it reached the surface of the lacuna. The bougie can do no good here, for it does not close the lacuna, by pressure; and, as it does not come in contact with the inflamed cavity, it does not change the nature of the action there. I have seen the tumour formed by the inflamed base of the lacuna, cut out by an incision on the outside of the penis. But this is a very severe operation. The method I have adopted to destroy the morbid action of the part is, first, to fix the point of my finger on the tumor on the penis, and then introducing one of the small perforated probes into the urethra, insinuate its point into the lacuna; then, withdrawing the probe, and

arming it with a small portion of the alkaline caustic, to introduce it again into the lacuna. This I have found most effectual indeed. The alkaline caustic, used in Mr. Whately's manner, is better adapted for changing the nature of the morbid action of the lacuna, and curing the discharge, than the more severe operation of the lunar caustic. When the caustic touches the surface of the lacuna, it then changes the disposition of the part, and the discharge and tumor diminish.

27. I have said that there is a stricture of a very troublesome kind near the orifice of the urethra, and visible. I have done all kinds of authorized violence to this stricture by the knife and caustic, and, after all, I have been obliged to have recourse to the bougie. From a case of this kind, I was confirmed in my opinion that a bougie should not be kept in the urethra

for any considerable time, as is the practice; but that the fullest effect is procured by merely passing in a bougie which is a little tight in the stricture, and withdrawing it after two minutes. By this method I have seen this callous hardening in the orifice of the urethra enlarged, and the necessity of introducing the bougie become less and less, until at last it was only necessary that the patient should himself introduce the bougie once in the space of a week. By this simple method all inconvenience was removed, after the knife and caustic had been tried in vain. I had under my care a young gentleman, who after repeated gonorrhœas and a gleety discharge from the urethra, continuing at intervals for years, came to me to have the urethra examined. He had a discharge from the urethra, a fullness in the perinæum, a feeling as if a tumor were there, and heat of

urine. I found that the ball probe passed through a firm cartilaginous stricture within a quarter of an inch of the orifice of the urethra. But on passing it farther down into the canal, and near the bulb of the urethra, I found a great tenderness in the canal, and that here was a difficulty even in passing down this small probe. Here in short was a stricture forming, and in what may be considered as its inflammatory stage. I removed it in the manner I have described as best adapted to the dilatable stricture; which I could not do by any of the usual methods of cure, seeing that in the orifice of the urethra there was a very firm undilatable stricture. After removing all urgent symptoms and all uneasiness from my patient, I consulted with a professor of surgery, who gave it as his opinion that this stricture in the orifice should be forcibly broken down by the silver probe.

Another surgeon of celebrity advised me to cut it with the knife. And for my own part I concluded that if ever there was a callous stricture which could be destroyed by caustic this was the very case. I applied the caustic, but did not succeed in removing the stricture. I introduced a small knife, and cut it across in two places, and then used the bougie. Still the white callous surface and the disposition to contract remained. I then used a hollow tube which remained, allowing the patient to pass urine through it. I introduced successively larger tubes, until the passage was so wide that I might almost have introduced my little finger. Yet the white sloughy appearance of the urethra remained; and it soon contracted again. I was now satisfied that violent methods would not do. I proposed merely that I should at the interval of some days introduce a smooth bougie. The confi-

dence my patient had in me was not yet exhausted ; but a friend carried him to another surgeon, who certainly in this case preferred the bougie to the caustic ; and if the patient is not now perfectly relieved from all tendency in the stricture to return, he feels no inconvenience, the contraction being enlarged by the occasional use of the bougie. It will be at once manifest, that in detailing this case, I can have no motive of vanity ; but as it seemed to me that there was a distinction between the practice and the written opinions of the gentleman under whose care the patient was ultimately ; and as I have thus learned to put more trust in my own experience than in the written opinions even of the most eminent surgeons, so I conceive that you may also find the hint useful.

28. Of the dilatable stricture I need say nothing here, as I have devoted an entire

dissertation to the subject. For the same reason I shall not add any thing to what I have said on spasmodic stricture.

29. The facts established in § 10, 11, that inflammation and high irritation will be produced at the sinus of the urethra and orifice of the seminal vessels by an inflammation of the anterior part of the canal, accords with our observation in the living body. I think it very likely, that the continuance of irritation and inflammation, near the neck of the bladder and seminal vessels, may terminate in suppuration, and that sacs of pus may form and communicate with the urethra. Inflammations remaining in the neighbourhood of the caput gallinaginis and neck of the bladder produce great distress ; there is severe scalding pain when the urine flows through the prostate gland and membranous part of the canal ; on introducing the urethra sound,

as the ball approaches the neck of the bladder, there is a burning pain, and, on withdrawing the instrument, the ball brings out matter from the urethra. The sensibility of this part of the canal, and the circumstance of this part being surrounded by powerful muscles, causes a distressing derangement of the action of the bladder. When these symptoms are a consequence of inflammation of the urethra forward, they will yield to leeching, fomentation, and mild purges, and the use of the bougie. If a large bougie can not be kept in the urethra, owing to stricture or inflammation forward in the canal, the ball of the urethra sound, being introduced and moved in the irritable part, will essentially serve to diminish the inflammation and unpleasant sensations. Stricture and inflammation in any part of the urethra are apt to produce inflammation and irritation near the neck of the

bladder, and it is a great relief to the patient, during the progress of cure, to have this accessory source of uneasiness diminished.*

30. Of all the diseases of the urethra, that more severe effect of inflammation which I have described under the head callosity or long stricture of the canal, is the most difficult to manage. The nature of this disease is ascertained by the introduction of the ball probe. The resistance felt is abrupt: and it is possible to distinguish the almost cartilaginous hardness of the canal by this instrument. When we have selected a ball of that size which will pass through the anterior part of the stricture, we find there is still a resistance, and

* Most of the confirmed opinions of the older writers are founded in observation. When they distinguished gonorrhœa by its seat, first as being of a milder kind when seated a little behind the glans in the lacunæ of Morgagni, and in the second place as more malignant and more apt to erode the parts when seated in Cowper's glands, they were certainly correct in fact, though their reasoning was erroneous.

that, although the ball is not grasped, yet there is a degree of interruption to its further introduction. When we move it onward, there is an irregular interrupted motion. I have said that the common method of introducing the armed bougie, so admirably described by Mr. Home, is adapted to the first and commonest kind of stricture. But I have no hesitation in saying that the application of the caustic in that manner to a stricture of this kind makes a tedious cure, and is full of danger. As we have to make our way through an inch perhaps of the length of the canal, it must be evident that the operation must be difficult, to carry the caustic in an undeviating line, especially at the curvature of the urethra. I shall by and by prove that the caustic has a double effect, first, As it destroys the sensibility and corrects the morbid irritability so distressing in the first instance,

and so sure a harbinger of increased obstruction. Secondly, as it destroys the callous part, or stricture, by killing the part, and by producing a necessity for the living surface beneath to throw off in slough the portion touched by the caustic. Now, I think we have good reason to avoid this last operation of the caustic, and confine it to the mere effect of subduing the sensibility of the part, and facilitating the operation of dilatation by the bougie. To this end certainly, in such a case, the alkaline caustic is well adapted.

31. That narrowing of the canal throughout a considerable part of its extent, which is attended with wasting of the spongy body of the urethra, may be readily removed by the occasional use of the bougie.

32. The fact that the inflammation is principally behind the stricture, and that fistulous openings behind the stricture are

found to follow more as a remote consequence than as a direct effect of the stricture, and to proceed from this inflammatory irritation, is I conceive the most important circumstance in all the morbid anatomy of the urethra. It is a neglect of this circumstance, and the consequence of the neglect, which has led some absolutely to reject the use of the caustic in all cases ; when, if the matter had been understood, it would have confirmed the superiority of the operation of caustic in this particular state of the parts. Often it happens that, during the operation of the caustic, this source of irritation being neglected, the process of ulceration is fostered and brought rapidly forward, so that fistula in perinæo is produced. This subject is so important as to deserve more particular consideration in a subsequent letter.

LETTER II.

On the dilatable Stricture of the Urethra.

1. I MEAN, in this letter, to communicate to you some observations on a complaint, which, were I to attempt to define it by a name, I should call it the *dilatable* stricture of the urethra. I shall not detail here the origin and progress of stricture : nor attempt to trace back effects to their causes, as in a formal treatise. I mean at present only to state a case : but one which has very frequently occurred to me in practice, and which, I must suppose, has often fallen in the way of every surgeon who is much consulted in diseases of the urethra.

2. The account which the patient gives of himself is nearly this : That, some time before, he had a severe gonorrhœa ; that

being particularly circumstanced, he could not so well observe the directions of his medical attendant as perhaps the case required; that the disease continued long severe, and he doubts even now whether he be entirely well: for he has observed that, although the discharge sometimes disappears, and he is free from any uneasiness, yet occasionally the symptoms return; at which time he has been sensible of a fulness in the perinæum, while, even during the absence of the discharge, there is still a heat of urine, and he has imagined a diminution of the stream of urine; that of late the call to make urine has become frequent, and he does not see what a young fellow has to do rising three times in the night to make water; and that whenever he exceeds in wine, or takes unusual exercise, or has connection with women,

the symptoms increase with a considerable discharge from the urethra.

3. Sometimes a patient comes to us with this complaint, imagining that he has got a recent gonorrhœa; but, although there be discharge from the urethra, there is no redness or swelling of the lips of the urethra, or inflammation of the glans or prepuce (*la gonorrhée habituelle benigne*).

4. When the urethra thus affected is examined by the bougie, it is found to be unusually sensible; and when we carry the bougie down to the stricture, there is severe pain, and the patient shrinks from the hand. If he allows us to persist, we shall be sensible of resistance to the point of the bougie; and if we force the instrument on, we shall feel it grasped as by a common stricture.

When the urethra-sound represented in the plate is used, I find that, as the ball is

passed into the urethra, there is much increased sensibility near the glans ; that having passed the ball a little way down the canal, the patient ceases to complain of it ; but when in its progress the diseased part is touched, and the ball passes through the stricture, there is pain and a feeling of soreness.

5. This state of the urethra differs from that of proper stricture, in being less rigid and firm. If, after examining a patient, whose urethra is in this state, you call the disease stricture, and he happens to consult another surgeon, he will be told that it is no stricture, and to prove this, one of the largest bougies is passed with exultation ! But this dilatation is not a cure of the disease ; on the contrary, every unpleasant symptom is often aggravated by the violence which has been used.

6. The state of the urethra which I have here described may continue for a long time ; the symptoms neither increasing in severity, nor altogether subsiding. A young gentleman had these symptoms for eighteen months before he came to me. I sounded the urethra of an officer, to ascertain the cause of many uneasy symptoms previous to his going to Portugal : I felt my bougie obstructed ; but the stricture was dilatable, and I became sensible of the state of the canal. At that time I could not do any thing for his permanent relief, and after a campaign of some months, he complained of the same uneasiness, and an obstruction was felt in the same spot. I have had many patients to whom it seemed difficult to remember the time when they were entirely free from uneasiness and occasional discharge ; and yet I found that their complaints were not absolute,

confirmed stricture, such as I shall by and by describe to you, but only through a part of the canal the bougie passed with difficulty. When, however, the complaint is of long standing, there are often several parts of the canal inflamed ; perhaps one of these spots gives proof of an unelastic and confirmed stricture having been formed. I have found a dilatable stricture deep in the urethra, and near the bladder, while there was a confirmed cartilaginous stricture near the extremity of the urethra. Indeed, when there are two or three strictures in the urethra, we are sure to find some of them more dilatable than the others. The original and first formed stricture is firm, and the resistance it gives is abrupt ; while the others partake more of the nature of the disease which I have here described. On one occasion, I found several parts of the canal inflamed, contracted.

and unnaturally sensible: after the lapse of nearly a year, I found the anterior of these spots of the urethra confirmed into a rigid stricture, having lost that elasticity which enabled me by gentle and continued pressure to dilate it.

7. I have already observed, that if, in the circumstances described, I say my patient has stricture, he may probably be told by another surgeon that I have been deceived, and that there is no stricture in the case; and to prove this, the surgeon takes a large bougie and passes it directly into the bladder, regardless of the pain which he occasions. It is by much too common an error to force a bougie into the inflamed urethra; and surgeons are induced to this, from the appearance of greater skill which is given by the dextrous introduction of the bougie where others have failed. Sometimes indeed a young man, ignorant of the struc-

ture of the urethra, introduces a bougie with a small point, which he allows to enter into one of the lacunæ, or to hitch against a fold of the urethra under the arch of the pubis. A surgeon, aware of the possibility of this failure, and well instructed in the anatomy of the parts, gives to a large bougie its proper curve; turns up the point of it, so that it escapes the fold of the urethra on passing under the pubis; and thus with real dexterity introduces a very large bougie where others have imagined, and made the patient believe, that there was a stricture. But it is quite a different matter when the surgeon forces one of his large bougies through a urethra narrowed by such a stricture as I have described above. This unmeaning cruelty, in driving in a bougie by main force, is generally followed by great increase of the discharge, sometimes with absolute obstruction of urine.

I am not to learn that the disease which I have described may be cured by the use of the bougie alone ; but it is not in this way that we are to proceed. Even in a healthy state of the uretha, the introduction of a very large bougie will produce a violent inflammation and discharge.

Captain —— of the Guards had been formerly under the operation of the caustic, and was entirely free from complaint ; but, being ordered abroad, he thought of introducing a bougie, to ascertain the state of the passage. He took the largest he could find in the shops ; he felt an obstruction which he overcame by force ; the consequence of which was, that he was attacked with a violent discharge, and came to me to be cured of stricture. On examination I found that he had mistaken the fold of the urethra, at the termination of the bulb backwards, for a stricture ; and that he had

forced in a bougie larger than the natural canal could allow to pass without injury. This force, and this injury to the canal, when diseased in the manner which I have described, will sometimes bring on severe inflammation with swelled testicle; sometimes the complaint is permanently increased; it happens, though very rarely, that the discharge entirely disappears, when the inflammation thus excited subsides. I hope to suggest a milder, more effectual, and certain cure, than the use of the common bougie affords.

8. Reflecting on the symptoms which I have described, I think you will be apt to conclude that all this is a consequence of gonorrhœa. Certainly this state of the urethra occurs very frequently after gonorrhœa. But as it follows irritation of the bladder, as it is produced by debauchery independent of infection, by whatever pro-

duces an irritable state of the urethra, by all the causes which produce confirmed stricture, I am bound to consider it under a distinct head.

9. Knowing how inaccurate I think the observations to be which have led to the notion that stricture is produced by muscular contraction of the membrane of the urethra; being aware too of the full meaning of the term spasmodic stricture; you will even, from what I have said already, suspect that I am describing the first or inflammatory stage of stricture. The propriety or truth of this you might question however, and so we should be led into controversy. I mean only to state the facts as they occur, and the method of cure which I have found to be successful; reserving the other part of the discussion for a future opportunity.*

* The question of the origin of stricture is discussed in the third letter.

10. If we consider the structure of the urinary canal, and the effects of inflammation, together with the history of this complaint which I have called the dilatable stricture, we shall have no difficulty, I think, in forming an opinion of the state of the part when thus diseased. The urethra is a dilatable tube, but it has in itself no power of expansion. It is distended only by the force of the bladder, and by means of the urine flowing from the bladder : and to facilitate this operation it is elastic, and very easily stretched. Inflammation changes the natural structure of all the parts of the body ; the hard bone by inflammation becomes soft ; the firm tendon becomes spongy ; the transparent membrane becomes thick and opaque ; and pliant parts become firm. So when the urethra is inflamed there is a diminution of its natural elasticity ; and a greater force of the bladder is

necessary to the discharge of urine through the inflamed part of the passage. When the general state of inflammation of the urethra subsides, if it has not been violent or of long continuance, the membrane resumes its pliancy. But it often happens that a part of the canal continues more permanently inflamed; a residue as it were of the more general inflammation. This part does not yield to the impulse of the urine (and the urine being of necessity driven more forcibly against this contracted part, is, no doubt, one cause of the continuation of the inflammation), and the bougie which passes easily along that part of the canal which is not inflamed, is resisted by this inflamed part of the canal. I had almost said by this contracted part: but the word *contracted* is improper as applied to stricture of the urethra, for the sides of the urethra are always in contact, and cannot

be brought closer by the formation of a stricture. A stricture is only a loss of elasticity, which prevents the due distention of the part when the push of urine is made, or the bougie is introduced.

11. I hope you will now agree with me, that the obstruction to the passing of the urine, of which I have detailed the symptoms in the first part of this letter, must be occasioned by this loss of elasticity—this inaptitude of the canal to dilate, which proceeds from vestiges of inflammation in a part of the canal, after a more general inflammation has subsided; and which attaches to distinct places of the canal.

12. In proposing a cure for this disease, we should naturally suppose it possible to remove it, by putting the patient upon low diet; confining him to his sofa; leeching the perinæum; fomenting or applying wet cloths, &c. I shall not say that this prac-

tice may not be beneficial in some cases ; but I am also well assured, that the patient may be long confined and greatly reduced, and yet after all derive but slight and temporary benefit from this severe treatment.

13. In the use of the bougie, we have the means of applying pressure, and at the same time distending the inflamed membrane ; by which the low chronic inflammation is disturbed and remedied. Being assured that the violence of inflammatory action is gone, if it ever was violent, we take a large sized bougie, introduce it, and press it until it passes the stricture ; we let it remain there two or three minutes. On the fourth day we introduce it again ; and this is repeated until the bougie passes without pain and the stream of urine is

full. But the use of the bougie in this state of the canal is a painful remedy. Sometimes the inflammation does not diminish, but is greatly increased, and there follow swelled testicle and all the train of distressing symptoms, which delay the cure and irritate the patient.

14. But in this effect of the bougie, in the case of dilatable stricture, there is much which deserves your attention. Some very incorrect opinions are received and acted upon, which have no foundation but in this fact. Some have advised that the stricture of the urethra be forcibly torn up by the use of a metallic probe, and they have successful instances to bring in vindication of the practice. So have surgeons in all ages brought cases to vindicate their practice and substantiate their opinions. Formerly it was no uncommon practice to break down the carunculæ and fungous

excrescences of the urethra ; and the cases given in former times, to prove the presence and destruction of carunculæ, were just as worthy of credit as those now brought forward to prove the possibility of breaking through a stricture. The stubborn fact which opposes our belief, is that the confirmed stricture is the firmest and densest part of the canal, and we can not thus break through it. Doing what the old surgeons supposed had the effect of bruising the caruncula, that is, pushing a probe or bougie into the urethra, has the effect merely of stretching and doing violence to a dilatable stricture ; and the issue of this is for the most part beneficial. When this same process of cure is tried with a firm and rigid stricture, the consequences are, intolerable pain, inflammation, and ultimate spasm. On observing the benefit resulting from this violence done to

a stricture, Mr. Hunter has this expression : "This I suppose either tore the stricture, or weakened it by stretching it suddenly so as to render it unable to recover its cotractile power for a considerable time. I have seen (he continues) where this produced good effects, and for a time removed the permanent stricture and prevented spasm from taking place." In the succeeding letter, I hope to prove satisfactorily that a stricture is not muscular, and that this reasoning is therefore incorrect.

In the mean time, the explanation which I have to offer is this, viz. that it is the pressure on the inflamed surface, and most of all the stretching of the inflamed membrane, which disturbs the chronic inflammation of the part; pain, even swelling, and an increased soreness are the effects of this practice; but with this new distur-

bance, the peculiar irritability depending on the former morbid state is diminished. I shall state shortly to you, as my memory serves, the circumstances which have led me to this opinion. You know the following to be a daily occurrence. N— came to me, complaining that although the violence of his gonorrhœa was subdued, and he had been comparatively well for some time, yet there remained a clear gleety discharge. I prevailed with him to let me introduce the bougie. I introduced one of the largest size, he fainted during the operation, from that indescribable nervous sensation, which will sometimes creep over a man, who has a bougie introduced for the first time. The resistance to the bougie was only such as indicated that the membrane of the urethra was fully on the stretch. There succeeded to this a copious purulent discharge, which subsiding left

him free of all complaint: repeated experience then establishes this fact. D (9) came with symptoms of stricture: a resistance was felt near the bulb to the introduction of the bougie, and there was extreme tenderness. Notwithstanding the sufferings of the patient the bougie was forced in. A similar operation was performed on the 3d day after, on the 7th, and on the 12th, when the bougie passed without pain, and the urine flowed freely without heat or spasm. During this inquiry, we find in the observations of Bruninghausen* something worthy of attention.

He made his patients dilate the canal of the urethra with the urine, by stopping the orifice and forcing with the bladder: he gives several cases in proof of his remarkable success in destroying strictures

* Biblioth. German. Vol. I.

by this method of distending the canal. I have no doubt but that in some instances this practice succeeded, from what I have done with the injecting syringe. A patient has used a strong injection for weeks, and returned to me no better. I have shown him how to distend the urethra, and keep it distended for a few minutes ; when the consequence was apparent, after once using the syringe.

15. In all these examples, there is a degree of violence done to the membrane of the urethra, and neither the bougie, nor the urine, nor even the injection, has any thing medicinal in it : there is only a dilatation of the canal, and a pressure on its surface. We might be inclined to say, that the contact of the foreign body was the cause of the salutary change, if in the two last instances the contrary was not proved, viz. that, unless the membrane of

the urethra be stretched, the change does not take place.

My conviction is, that Bruninghausen, like those who use the metallic bougie to destroy stricture, do not cure the firm stricture of the urethra, but only subdue the remaining inflammation which produces and accompanies this *dilatable stricture*. You may imagine, after what I have said, that I wish to recommend this manner of destroying the disease by violence. I have stated the facts as they bore on this point, but not the whole truth. The effect of this violent introduction of the bougie is irregular, not sufficiently within our controul, and sometimes it is ineffectual in eradicating the disposition to inflammation and stricture, and sometimes, as might be imagined, it aggravates the disease.

I have a milder and more effectual remedy in the use of caustic; and notwith-

standing the hardy manner in which some men have spoken of the caustic, as being full of danger and very painful, with confidence I say, that we have a milder and more effectual remedy in the caustic than in the bougie.

16. In applying the *kali purum*, or alkaline caustic, to the common stricture, as recommended by Mr. Whately, I had in several cases been agreeably surprised at the rapid amendment of my patients. For example, I found that, after a single application of the *kali purum*, one patient said that he had no kind of uneasiness remaining; another, that if he had felt previously as he did then, I should never have seen him. I found that, instead of dreading the application of the caustic, my patients relied upon it for the removal of all unpleasant symptoms; that they discharge the urine more freely in consequence of the

application ; and that, in having connection with women, the functions of the parts were less disordered. One gentleman returned to me, making the impudent request that I would apply the caustic for this last specific purpose ! a request with which you may well imagine I did not comply.

17. Further experience, however, of the effects of this alkaline caustic did not accord with my first success. I found that, wherever there was a confirmed and hard stricture, its application was little more than innocent. I found that, after frequent applications, although the urgent symptoms were kept under, yet the stricture was not destroyed ; that, after repeated applications of this caustic, on introducing a soft bougie into the canal, the indentation upon it shewed the stricture to have preserved its firmness ; I may even

say, its sharpness. After several applications of the caustic in Mr. Whately's manner, I have found on dissection no trace of its operation on the stricture. See Plate IV.

18. On revolving these circumstances in my mind, and particularly considering that this caustic took off the sensibility from the part of the canal which it touched, and thereby diminished the irritability of the parts, but did not destroy the stricture, I set about a comparative trial of the effects of the two caustics, the *kali purum*, and the *argentum nitratum*.

19. I found that, although the alkaline caustic was particularly strong when applied to a living surface, and its influence confined to that surface, yet, when a small portion of it was inserted into the end of a bougie, it became, even during that operation, moist and soft by the absorption from the atmosphere; and that, further,

when the point of the bougie, thus loaded, was dipt in oil, or covered with soap, the caustic was rendered mild; and, by the time it was carried through the urethra to the stricture, it was little else than a liquid soap with a large proportion of alkali.

20. I took off a small portion of the cuticle from my arm, and applied the lunar caustic to the part during half a minute. A deep slough formed, accompanied with a kind of soreness and sensibility over the arm. A fortnight afterwards I tore up the slough, which was dried and hardened, and a small but deep hole was left. I applied the *kali purum* in the same way; that is to say, I cut off a portion of the cuticle from my arm until the surface bled. I introduced a small portion of the alkali into the end of a bougie, dipped the end of the bougie in oil, then moistened it with saliva, and applied it to my arm,

taking as nearly as I could the usual time occupied in the operation on the urethra. The pain was sharp; but there was less swelling, less blush of redness round the spot where it was applied, than in the former instance. These effects soon subsided, leaving no unpleasant sensibility on the arm, as the former caustic had done; and the vascular surface was not covered with a slough: although a certain transparent whiteness was on the surface, yet the small vessels could be seen. On dropping a little diluted nitrous acid, which happened to stand by me, on the spot, there was no pain; but on touching with the acid a part of the skin to which the caustic had not been applied, but of which the cuticle was taken off, the pain was exquisite.

21. These experiments, though on a very trifling scale, were yet quite sufficient

to explain to me the effect of the application of the *kali purum* to stricture in the urethra. In the way in which it is applied, it becomes a weak caustic, flowing out as it is dissolved; deadening the surface of the urethra, and subduing the inflammation, but not sufficiently powerful to bring a deep slough from the firm stricture. Now the portion of the urethra which is in a state of inflammation is very sensible to the urine passing over it; to the touch of the point of the bougie; or to the action of the muscular fibres which surround the urethra. But when, by the operation of this milder caustic, the sensibility of the surface is diminished, then the urine or semen is emitted without pain, and even the bougie can be introduced. When the bougie is introduced into a man's urethra, he is more sensible of the degree of force than the surgeon is; he judges of the vio-

lence by the pain. And here a surgeon who is so disposed may have an opportunity of deceiving his patient. When a bougie of a small size is resisted by a stricture, and gives pain, he may yet assure the patient, that if he will submit to the caustic, he will introduce a much larger bougie with less pain, and that immediately after the application of the caustic. The reason is that, the sensibility being diminished, the patient does not shrink from the hand; and now the dilatation of the part of the passage suffers the instrument to enter, and the patient thinks that the stricture is destroyed. This is one of many occasions which exposes the patient to deception, and makes it of importance in the cure of this disease, above all others, that the sufferer should be satisfied of the honour and the fair professional fame of

his surgeon, before he entrusts himself to his hands.

22. In contrast with the effects of the *kali purum*, thus applied in a mild form, observe what are the effects of lunar caustic on the urethra. When a part is touched by the caustic it does not at once become loose: the dead slough remains attached to the remaining part; and the obstruction* for the time is necessarily greater. The obstruction is greater, because it is sufficiently evident that the union of the caustic with the substance touched produces a sponginess or expansion in it. It is by a change taking place in the living part that the dead comes off in a slough. This operation, the effect of an excited action of the living vessels, is necessarily slow. If the application of the

* The mechanical obstruction, not the spasmodic difficulty of passing the urine.

caustic has been gentle, the dead matter comes away insensibly ; or only some very small shreds or filaments are observed in the urine. If the application of the caustic has been more severe, a distinct pellet of slough will be pushed off with the urine about the fourth day.

23. As to the white matter which is attached to the lunar caustic on withdrawing the bougie, I know not what to think of a surgeon who can suppose this concrete to be a true slough. The matter discharged from the urethra in consequence of introducing the lunar caustic is of three kinds ; 1. The coagulated secretion of the urethra which attaches to the end of the bougie ; 2. Coagulable lymph ; which is one effect of inflammation, and therefore an after process ; 3. and lastly, The proper slough from the stricture or membrane of the urethra, which has been injured and disorga-

nized by the operation of the caustic, and is thrown off by the living surface. Some authors have spoken of keeping the lunar caustic in the urethra for a few minutes, as if a minute more or less was of little consequence ! I kept the armed bougie, as it is termed, one minute introduced into the sheath, or prepuce, of a ram ; on killing the animal on the fourth day, I found a deep slough, of double the diameter of the caustic employed, almost detached, and leaving a deep ulcer. I applied the caustic to the stricture of a young gentleman for a minute ; on the fourth day his urethra was plugged, until the urine forced off a large membranous slough. It is the coagulated matter attached to the face of the caustic which prevents the entire destruction of the urethra, when the armed bougie is kept more than a minute in the canal.

24. These are facts which I believe will not be contradicted. Consider then how it happens that, in certain cases on record, the caustic goes through the stricture even during its application as a caustic. Consider also the instances frequently mentioned, where the bougie is described as going into the bladder twenty-four hours after the application of the caustic. What can we understand to happen in such cases, but that the surgeon is deceived by the circumstance I have just explained? that the diminished sensibility of the passage, and the greater force which the patient can permit to be employed after the use of the caustic, enables the surgeon to pass the bougie? I must here express my conviction, that neither the abettors of the use of the alkaline, nor of the metallic caustic, have explained the cause of that

relief, which the patient experiences, on its true principle.

An important distinction betwixt the use of the *kali*, and of the *argentum nitratum*, as caustic, is, that a certain lubricity is given to the urethra, by the solution of the former forming a soap with the secretions, so as readily to admit the bougie into the narrow part of the canal : but the *argentum nitratum* coagulates the secretions, and when it has been applied to a stricture with the intention of burning it, eating deep, and acting as a caustic, the part touched by the caustic is dead, rough, and no longer smooth and lubricated ; it ought not to be disturbed by the introduction of a bougie, for the bougie readily strikes upon this part ; the slough, instead of separating by the natural process, is torn off, and hæmorrhage is the consequence. Blood follows when the surface of the canal only is torn off ; if the

slough be deeper, the spongy substance of the urethra is opened, and the bleeding is profuse.—If, after a severe application of the lunar caustic, the patient feel as if something plugged the urethra at the part, an effect of the partial loosening of the slough, he must be cautioned against forcibly expelling his urine, for this is apt to tear up the connections and produce hæmorrhage. Allow the natural process of sloughing to go on, and there will be no breach either of the vessels or of the cells.

25. The supposition that the *kali purum* abrades and takes off the surface of the stricture appears to me to be without foundation; that soap which is formed is by the union of the caustic with the secretion of the urethra. By this union, and the mixture with the oil in which the bougie is dipped, the caustic is made mild; and having the quality of lubricating the strictured part

of the canal, I have used it much where I wished to introduce the bougie at the same time.*

Having explained what I conceive to be the nature of the dilatable stricture of the urethra, and shewn in a general way the operation of the bougie and of the caustic, it remains for me to speak to you more pointedly of the *means of cure*.

* In conclusion on the effects of caustic, it must be evident to any one who turns over the leaves of the books on this subject, that there is nothing new in the practice, and no claim of originality can be raised by any one of late years; and even authority may be found for the application of the *lapis infernalis* in M. Daran; and in Paréc, Hildanus, S. Vander Wiel (Med. Anat. Chirurg.), Astruc, and many others, were it worth any man's time to inquire, we have sufficient proof that escharotics and caustics were in common use. Their notion of the disease indeed naturally led them to that practice in former times—The old surgeons sometimes used a canula to convey the escharotic, oftener a bougie. They used corrosive sublimate, red precipitate, verdigris, burnt alum, lunar caustic, lapis infernalis; so that there can be nothing new in the practice, unless it be in the intention with which the caustic is applied, or the dexterity of the application.

26. The plan of cure which I pursue on the principles I have stated is this. I ascertain by means of the ball probe the place of the urethra which is inflamed and narrowed. I take one of the ball probes, * with a hole drilled in it, and load it with a small portion of the kali purum. I pass the ball down to the obstruction, and allow it to remain until the alkali is dissolved: of course it flows out upon the inflamed surface.

27. The patient has no unpleasant sensation on the introduction of this instrument; a warmth not rising to pain is the only sensible effect. When the alkali is dissolved, a bougie of such a size as gently to dilate the stricture, is introduced for the space of a minute. The bougie glides easily into the stricture now; because the parts are soaped by the dissolution of the

* See the Plate of Instruments.

alkali, and the sensibility of the surface deadened by the operation of the caustic. The result of this treatment is a relief of the urgent symptoms. The application is repeated at the end of three days. After three or four applications of the caustic, the bougie alone is to be used, and the caustic to be had recourse to only if the diseased irritability and sensibility of the passage are unsubdued. I trust that you will not suppose me to have fallen into the vulgar error of imagining that there is here a specific effect produced by the use of the alkaline caustic. I have said that it deadens the surface, and that the cure is accomplished by this effect, and the consequent destruction of the morbid irritability and pain which keep up the disease. This effect of late I have found to be as surely produced by the use of the lunar caustic as by that of the kali purum. It was impossible to observe

the effects of the lunar caustic used for the purpose of destroying an obstinate stricture, without being convinced that the immediate good consequences resulted from its deadening the morbid surface, not from its destroying the stricture and carrying off the solid substance. By applying it in the same way in which I had used the alkaline caustic, or by inserting a very small portion of it in the end of the bougie, I found that I could allay the irritation, and in the end subdue the inflammation, which produces the dilatable stricture; indeed I have used the lunar caustic with immediate benefit when I thought the cure proceeding slowly under the use of the alkaline caustic. I shall consider this subject further in the next letter.

LETTER III.

Of Spasmodic Stricture.

IN entering upon this subject, it will be necessary to examine and refute the opinions of some authors who are now alive. This I should regret, if I did not know them to be men in high estimation with the public, and who well deserve the respect and reputation they enjoy ; if I were not persuaded that, being men of science, they will court rather than shun a fair and candid discussion ; and if I were not quite sure that I am incapable of dropping any expression unbecoming their character or my own honour. I enter upon the controversy, because, if I cannot shew the fallacy of some commonly received opinions on this subject, I must not only entirely fail in the object of my inquiry, but have the addi-

tional mortification of thinking that I have been practising our art in a manner which cannot be justified.

1. I take my ground on the basis of morbid anatomy. Wherever this has been steadily adhered to as the foundation of observation and reasoning in our science, that science has been progressive : it has been interrupted in its course, even amidst the most brilliant reputation of its professors, wherever men have arisen whose inventive powers have led them to reject, rather than to seek, the aid of anatomy. In perusing books on this subject of stricture in the urethra, you will have particular occasion to observe, that ignorance of the appearance of disease kept surgeons for a long time undecided and wavering in their opinions, and feeble and inefficient in their practice ; while Mr. Hunter, by establishing one distinct fact, regarding the nature of

this very common complaint, did infinitely more good than even by the hint of practice which he left in legacy to the profession; or than has been done by all the authors before or since his time.

2. The stricture which I have represented to you * is of the most common kind. You will be satisfied, on examining it, that the white condensed substance which constitutes the stricture, must be equally incapable of yielding to pressure, and of spasmodic action. The fact brought forward by Mr. Hunter which proves the firm nature of stricture; the confirmation of that fact by others since his time; and these examples which I have given you in the drawings, are in my mind sufficient to prove that a stricture cannot be spasmodic; that even allowing the part of the urethra diseased to have been originally muscular and con-

* See Plate I. & IV.

tractile, this condensation and callosity must be attended with loss of the contractile power. We hear perpetually of spasmodic stricture, and of spasmodic obstruction in the stricture. There remains not a doubt in my mind that this is an error; and that it is an error of great consequence, as it leads the surgeon off from the principle and sure guide in practice. I purpose, therefore, thoroughly to examine this subject: for while I deem it in my own mind quite sufficient that all strictures are attended with a degree of spasm, although it is demonstrable that some of them are as firm as cartilage, and that they cannot in themselves contract or be dilated, yet I would not have you to rest satisfied with this argument.

3. The notion that the occasional obstruction to the discharge of urine, when there is stricture in the urethra, arises from spasm, is very natural. When the patient

is unable to expel his urine, and feels a girding, and tension, and pain in the seat of the stricture, he attributes these indirect effects to the stricture primarily. But this belief on his part must not satisfy us. Neither, I hope, will you take implicitly the effect of heat and cold on the stream of urine as evidence of the varying state of the stricture; since it occurs equally in health and disease. I believe it to be a very erroneous opinion, that there is relaxation of the stricture when the bougie is allowed to remain in contact with it. There are two circumstances which have given origin to this opinion, that the stricture spontaneously relaxes. If a bougie of the common sort rest against a stricture, it is sometimes prevented from passing by its stiffness; and when it softens and becomes pliant, the point takes the due turn and passes the obstruction. Again, the first touch given to the sensible

stricture, however slight, gives the most acute pain, that marrow-piercing irritation, which is so insufferable to the patient: but on continuing the gentle pressure, the patient is at last able to bear the increase of it until the point passes the stricture. This is called the relaxing of the spasm in stricture. The feeling as if the bougie were held and grasped by the stricture is the greatest when the bougie has been suffered to remain in the urethra some time; and is occasioned by the stricture making an indentation on the soft bougie, or by the bougie becoming dry at that part where it is most firmly wedged.

4. I shall now endeavour to shew you how this idea of the spasmodic nature of a stricture has arisen; and that it has proceeded on false data. By confounding the effect of the proper muscles of the urethra, the whole lining membrane of that

canal has been imagined to possess a muscular property. I made the following simple experiment, in order to put this to the test. I got a small ivory ball, to which I attached a thread. I introduced the ball into the urethra; I made the man endeavour all he could to push it out, but he could not: neither was it retained in the slightest degree when pulled by the thread. I thought it might be more satisfactory if I imbued the ball with something stimulating. I tried coarse soap and spirits; but still there was no power in the urethra to retain the ball, or to push it forth. This could be done only by the urine behind it, and the operation of the bladder, or the ejaculator seminis. I need not add that this experiment was made upon a part of the urethra anterior to the seat of the ejaculator seminis. In the course of practice, I find that, when the silver ball is introdu-

ced down to the ejaculator seminis, it is resisted by that muscle (especially when the parts are irritable.) I find it sometimes thrown out of the grasp of the muscle, but when pushed fairly into the sinus of the urethra, which is into the middle of the muscle, the ball is allowed to remain.

5. I wished also to have the fact of the action of the urethra on fluid before you. This was easily done. I employed a glass tube to throw an injection into the urethra, the extremity of the tube being adapted to pass into the extremity of the urethra. Pressure was made on the urethra five inches down. By elevating the tube or column, in the manner of the mercurial injecting apparatus, the fluid distended the urethra ; but no irregularity in the height of the fluid in the tube indicated any muscular power in the urethra to discharge its contents. When the urethra was distended, the slight-

est touch upon it with the finger elevated the fluid in the tube: but no effort of the patient produced the effect. When he made the effort it was with the ejaculator seminis behind the part of the urethra compressed by the fingers.

6. Here is a simple detail of facts, which are in themselves conclusive on this point, viz. that the part of the canal anterior to the muscles which surround it has no muscular power. If we examine the structure of the canal of the urethra anatomically, we shall be irresistibly led to the conclusion that it is merely elastic; and that where muscular action is required there are superadded muscular fibres embracing the proper canal. I have carefully examined the membrane of the urethra through its whole extent. I find it very thin and delicate; but I see no appearance of muscular fibres transverse or longitudinal. I

I have examined, by dissection, the part of the urethra in the neighbourhood of stricture ; but in circumstances of long continued irritation, and where the muscular coat of the bladder was greatly increased in strength, I have not found a corresponding change on the urethra. Mr. Chevalier imagines, that in cases where there has been much irritation from blisters preceding death, the muscularity of the urethra has become evident. Although there are few whose opinion would influence me more than this gentleman, yet I can see nothing in his preparation but the effect of corrugation ; a semblance of fibres which would disappear on stretching the canal. At most, what are seen on dissection are but fibres ; and in the simplest membrane, as in the peritoneum, fibres are always to be seen on minute inspection, where nevertheless there is no muscular power.

7. The following is the form of argument in favour of the muscular contraction of the urethra: “ That the membrane
“ which forms the lining of the urethra
“ does occasionally contract when stimulated, may be illustrated by a variety of
“ instances both in health and disease.—
“ In hot weather when the urine contains
“ a greater porportion of salts, from an unusual quantity of the watery parts of the
“ blood being carried off by perspiration,
“ and the stream is rendered smaller than
“ common, by the stimulating quality of the
“ urine producing contraction in the internal membrane of the urethra—when a
“ portion of this membrane is in an inflamed state from gonorrhœa, its surface is
“ more readily stimulated, and the urine,
“ even when diluted, by the patient taking
“ watery fluids frequently into the stomach,
“ which pass by the kidneys, causes it to

“ contract so much, that the urine comes
“ away only in drops, or a very small
“ stream; in this state of the parts, if the
“ penis be immersed in warm water, the
“ effect of the stimulating urine is less sen-
“ sibly felt by the membrane of the urethra,
“ which frequently becomes relaxed, and
“ the water passes more freely. After the
“ inflammation of gonorrhœa is gone off,
“ and stimulating injections are used, with
“ a view to stop the discharge which con-
“ tinues; in many instances where the in-
“ jection stimulates the parts to a great de-
“ gree, it will not pass on towards the blad-
“ der, but produces so strong a contraction
“ in the membrane, as entirely to obstruct
“ the course of the injection, and frequent-
“ ly reject it altogether with considerable
“ velocity.”

Practical Observations by E. Home, Esq. Vol. I. p. 16.

8. Now I ask you, are such arguments
as these sufficient to account for the for-

mation of stricture by the spasmodic action of a fibre of the membrane of the urethra ; when the doctrine and practice are so intimately connected as on this occasion they are ? The answer to all that is here transcribed is this : That five inches of the canal by measurement is surrounded by strong and proper muscles. We find the *accelerator urinæ*, or *ejaculator seminis* ; the *sphincter vesicæ* ; the *compressor prostatæ* ; the *levator ani* ; clinging around the canal of the urethra.* It must never be forgotten, that it is the sensibility of the urethra which governs the contraction of these muscles. I trust that I have proved to you the part of the urethra which is anterior to the muscles, and which is not em-

* Indeed when we look to Haller, Soemmering, Santorini, Winslow, and Albinus, who describe the minute muscles about the prostate and membranous part of the urethra, and add to these the description of Mr. Wilson, of Windmill-street, we can be at no loss to account for spasm and irregular action in the posterior part of the urethra.

braced by them, to have no power of contraction. Who indeed ever experienced an obstruction from muscular action to passing the bougie into the mouth of the urethra? Yet this is sometimes the seat of an obstinate stricture.

9. In a great measure from the proofs I have already laid before you, but principally from the symptoms of the disease itself, I object to the following reasoning:

“ This contraction and relaxation are
“ the natural and healthy actions of the
“ urethra ; but this membrane, like every
“ other muscular structure, is liable to a
“ spasmodic action which produces a de-
“ gree of contraction beyond the natural ;
“ and in that state the canal loses the pow-
“ er of relaxing till the spasm is removed.
“ When this happens it constitutes disease,
“ and is termed a spasmodic stricture.

“ While a stricture is in this stage, it is
“ only a wrong action of the membrane of
“ the urethra; and if the parts could be
“ examined, in their relaxed state, there
“ would be no appearance of disease.

“ When a portion of the urethra is dis-
“ posed to contract beyond its natural easy
“ state, this disposition commonly increa-
“ ses till the part becomes incapable of fall-
“ ing back into a state of complete relaxa-
“ tion, and the canal remains always nar-
“ rower at that part.

“ In this stage it is both a permanent
“ stricture, and a spasmodic one. It is so
“ far permanent, that it is always narrower
“ than the rest of the canal; and so far
“ spasmodic, that it is liable to contract oc-
“ casionally in a still greater degree.

“ A stricture in the urethra, whether in
“ the spasmodic or permanent state, is a
“ contraction of the transverse fibres of

“ the membrane, which forms that canal.”

10. In the first place, notwithstanding the confident manner in which this account of the formation of stricture is delivered, I hope you see that it is but hypothetical, and established on no proof. For my own part, I confess my wonder that men in a profession like ours, whose business leads them to observe and reason continually, should first take it for granted, that there were circular muscular fibres in the membrane of the urethra: then that one of these fibres could obstinately and permanently contract: Nay further, as a stricture is often on one part of the circle of the canal only, that the third part of this circular fibre contracts thus to form a stricture; we find them even implicitly believing that this single fibre, or third part of a fibre, could take a “ wrong action,” and become occasionally contracted

so as to be a spasmodic stricture ; then permanently contracted to a certain degree ; and at the same time capable of a further occasional contraction, so as to become “ both a permanent stricture and a spasmodic one.”*

11. Having proved by experiment that the membrane of the urethra is not muscular ; by dissection, that there are no muscular fibres discernible ; and that a stricture is a callous part, incapable of contraction or relaxation ; I leave this part of the subject to examine the true nature and cause of spasm attending stricture in the urethra.

12. I am confident that the profession will come to as full a conviction that the

* The term organic stricture is used in contradistinction to spasmodic stricture. In the language of pathology, organic derangement means a defect visible on dissection, while the diseases of nerves and muscles may have existed without presenting the defect to the eye.

sole origin of all strictures in the urethra is inflammation, as that adhesions of the pleura are caused by inflammation. For the most part the cause of stricture is gonorrhœa: But this specific kind of inflammation is not always the occasion of it: It has its source in whatever produces continued irritation to the parts; previous disease in the bladder, for example, will produce it. Most commonly, however, the course of the disease is this: The gonorrhœa has gone on unchecked until the inflammation being at its height, there is purulent secretion and chordee; the disease which was originally seated near the orifice of the canal has been propagated backwards: The real inconvenience now, the pain and alarm, make it necessary to use proper remedies, and for the time secure continence and care on the part of the patient. The symptoms are amelio-

rated, but the irritation does not entirely subside. The inflammation is only more partial. Still the patient has pain and heat in urine, and there still from time to time flows a gleet discharge. This gleet, it appears, is not, as often supposed, the effect of mere relaxation of the vessels after inflammation, allowing too profuse a discharge ; but the vestiges of inflammation in a milder and more chronic form. If this state of the parts be permitted to continue, a firm stricture will in the end be formed. The degree and firmness of the contraction will be found to hold a strict relation to the length of time, and the frequency of the occasional increase of the irritation, pain and discharge. The effect of the inflammation in producing stricture varies somewhat, as I have taken an opportunity of already explaining to you.

13. I have now to state to you how it happens that there is spasm and difficult flow of urine attending all the stages of stricture ; from the first inflammation, till the disease is confirmed, and the contraction becomes firm as cartilage. But to have the whole of this subject fully before us, I must draw your attention to the classification of muscles, and to the sympathy and consent which unites them in function.

In the voluntary motions of our limbs there are two distinct states of muscular action necessary to the movement. If the finger or hand is extended, or closed, it is not by the mere contraction of one muscle forcibly elongating its antagonist, nor does the relaxation of the one follow the contraction of the other ; but if the action be to bend the finger, the same influence which is exerted to excite the flexor to contraction

is also exerted to relax the extensor. To bring this to demonstration I made the following experiment :—

14. I cut the skin over the strong extensor tendon of a cat's leg. I cut through the tendon, and drawing it out, I tied a fine silk thread to it; and to the thread I attached a weight (such as to stretch the muscle gently) and hung it over the table. I now set about observing the effect of the action of the leg, and with considerable satisfaction, I observed, that when the flexors acted, the weight appended to the extensor tendon descended. I extended the leg of the animal, and I found that the weight rose, and the tendon was drawn into the wound. I bent it, and the weight descended, and the tendon was drawn out of the wound. It appears then that a necessary concomitant of the contraction of one set of muscles is the relaxation of their oppo-

nents or antagonists. That there is a concatenated state of the two classes of muscles in every natural action ; that, however strange it may appear, there is no perfect relaxation but in consequence of motion ; for that state of the limb which we call rest is but an equipoise of the force of the two classes of muscles. It is only when there is a contraction of one set of muscles that there is a perfect and entire relaxation of the other. As this state of relaxation of one muscle is as necessary to the motion as the forcible contraction of the other, I may call this influence exerted on the yielding class of muscles a negative activity.

15. When we have ascertained that there is this very peculiar relation existing between the two classes of muscles thus combined in function, our next inquiry should be directed to find what muscles

are antagonists of each other. Of the voluntary muscles there are two classes ; and by the direct influence of the will we call one set into activity, and the other indirectly into a state of relaxation or negative activity. Perhaps I ought rather to say that we are equally ignorant of the operation of the mind on either set of muscles ; but being taught by experience to observe the contraction of one set of muscles followed by the motion of the member, while we do not see the necessity of the voluntary yielding of the opposite class, we improperly call this last an indirect operation of the will, since the change in the state of the two classes of muscles is synchronous and concomitant, and proceeds in both directly from the agency of volition. It is, however, a subject which I mean not at present to pursue, since I have got exactly the proof

we required to enable us to proceed in our inquiry.

16. There are some classes of muscles over which we have no direct power of the will to make them relax, or certainly not without calling for the activity of their antagonists: For example, the muscles betwixt the sternum and larynx are in permanent action when the throat is at rest; and the change which we observe them subject to, is from action to relaxation. But to produce this relaxation we have to bring into contraction their opponents, viz. those which arise from the jaw, and are inserted into the larynx, and which in the act of swallowing draw up the throat while the lower muscles relax and are stretched. All the sphincter muscles are of this class: Their more permanent state is firm contraction, and their powers are not exhaustible like those of the muscles of voluntary

motion. By their contraction they retain the contents of the hollow viscera. These hollow viscera are surrounded with a muscular coat, which is of course the opponent of the respective sphincter muscles. And now you will readily understand that the sphincter does not yield up its office, or relax, unless there be a corresponding contraction in the muscles of the hollow viscus. Thus the sphincter to the lower orifice of the stomach will not cease to reject the matter offered to be transmitted to the intestines, unless the stomach contract naturally ; and the natural contraction of the stomach must be preceded by the full and natural digestion of the food. Often, therefore, the food, being of an indigestible kind, is retained loading the stomach. In the rectum, the effort to evacuate, viz. the contraction of the gut, is attended necessarily with the perfect relaxation of the sphincter

ani. For example, if ever you had a tedious operation to perform in the rectum, whether the examination of a fistula, or the extirpation of a tumor within the gut, or the management of scirrhus contraction, you must have observed that whenever there was an action of the higher part of the gut, the tightness of the sphincter ani was relaxed. So exactly it happens in the womb during delivery ; the orifice and fundus of the womb have antagonist fibres, and the contraction of the body and fundus of that viscus is attended with relaxation and distention of the orifice.

17. Now we approach the subject of our discussion with facts established. The bladder is surrounded with its muscular coat, the *detrusor urinæ*; the neck of the bladder is surrounded with the *sphincter* ; the prostate gland embraced with the *compressor prostatae* ; the membranous part of

the urethra, besides having circular fibres, is pressed by the *levator ani*; and the sinus, and a considerable part of the urethra, is surrounded by the *ejaculator seminis*. These last four muscles are all opponents to the muscular coat of the bladder, and are in sympathy with it. Not that sympathy which combines in simultaneous action, but that connection which exists betwixt flexor and extensor muscles, and which provides that the action of the one shall be attended with the relaxation of the other.

18. The paralysis of the urethra has been treated as a disease*: the incontinence of urine is considered as an effect of the diseased inactivity of the muscles of the urethra. This is a short-sighted view of the symptoms. The disease is in the over action and irritability of the coat of the bladder; the smallest quantity of urine fall-

* See Hunter on the Venereal Disease, p. 166.

ing down into the bladder produces an action there, and consequent relaxation of the sphincter ; and the water dribbles insensibly away. The disease is of the same nature with that which produces the relaxed anus and pendulous gut of a child whose rectum is irritated by ascarides. Blisters, tincture of cantharides, spices, and steel medicines, are improperly given on the idea of exciting the relaxed sphincters : whereas the attention should be directed to ascertain the cause of the contraction of the bladder. Whenever we are perfectly aware that the contraction of the bladder and the relaxation of the urethra, or the contraction of the urethra and quiescence of the bladder, form one combined action, we comprehend how a blister to the sacrum or pubes will sometimes produce stranguary, sometimes incontinence of urine ; for it produces an immoderate irritation on the parts which

stand united in function, disordering their natural relations.

19. When the bladder is distended with urine, and the muscular coat has no disposition to contract, the introduction of the bougie into the urethra will cause the urine to flow. The reason is, that the muscles of the urethra being distended with the instrument, this state of forcible distention calls the muscular coat of the bladder into action—without which no distention of the urethra would procure evacuation. We may observe that, when a bougie is introduced into the urethra a few inches only, there is no consent with the bladder; but when the point of the bougie reaches the sphincter muscles, and even when it distends only the fore part of the ejaculator seminis, the desire of passing urine is very great.

20. Spasm of the urethra is supposed to be directly the reverse of paralysis in the urethra. But I have now to shew you that, in spasm also, the bladder and the muscles surrounding the urethra are still engaged together, and are mutually disordered as antagonist muscles.

21. If you look into authors, you will find that the urine is said to be obstructed from many causes ; from debauch, inducing spasm in the neck of the bladder ; from fulness in the vessels of the neck of the bladder ; from stricture ; from piles ; from injury to the perinæum, or disease of the prostate gland. In all these instances, the obstruction to the flow of urine is in a great measure owing to the diseased action of the muscles ; in some of them it is entirely to be attributed to this cause.

22. I shall state the simplest and least equivocal case. A young man, through

false modesty, being in the company of ladies, resists the urgent call to make urine; at last he escapes, and thinks to evacuate the whole contents of the bladder, but cannot pass a drop of urine.

A woman in labour has the neck of the bladder pressed by the head of the child, so that the bladder suffers great distention. After the delivery I have seen it distend the belly to a degree as great as before labour commenced, and still the urine did not flow.

23. In these cases the distention of the bladder has too far stretched the muscular coat; and by this distention the muscular fibres have suffered a kind of paralysis, and are incapable of contraction. But this is not all; the antagonist sphincter muscles will not relax, or but very irregularly; there is a spasm and girding of the muscles of the urethra: and pressure on the

belly will not empty the bladder; the catheter must be introduced. Now this pure case, if I may use the expression, is sufficient to shew us, that, however obstruction of urine may commence, in the end the muscular apparatus is engaged, and becomes a cause of increased difficulty of passing the urine. This is especially the case in stricture of the urethra; and while the stricture is stationary, neither contracting nor relaxing, it has the effect of disordering the natural sympathy of the muscles, and of inducing contraction of the sphincter fibres and impeding urine.

But there is another and a more frequent cause of spasm in the urethra and neck of the bladder, the consideration of which is my principal object in this letter.

24. In the diseases of the urethra, as in other parts of the body, inflammation precedes or accompanies increased sensibility. Where stricture is, there is much increased sensibility ; and wherever the stricture is exquisitely sensible, there we are sure to find the function of the muscles deranged, forming the case which is called spasmodic stricture. This spasm is produced by the acrid urine coming in contact with the sensible surface of the urethra, which being inflamed is not embued with its sheathing secretion: instantly the muscles are called into action ; the ejaculator seminis contracts by impulse, as is its nature when excited ; and the other sphincter fibres contract firmly : so there is frequent call, and frequent stoppage, of the urine, with painful contractions of the fibres on

the inflamed and excited parts. This action of the muscles of the urethra does not merely obstruct mechanically the flow of urine, but by the sympathy existing betwixt these muscles and the *detrusor urinæ*, or muscular coat of the bladder, the contraction of the bladder ceases.

25. Thus, out of a party of men drinking together, there will often be one who before evening cannot pass a drop of urine. On inquiry, you will find that he has had slight disorder in the urethra, perhaps the remains of gonorrhœa. It is a mistake to suppose, in such a case, that the fulness of the vessels has closed the passage to the urine; the same cause which has inflamed his countenance adds to the inflammation and sensibility of the urethra, and the first drop of acrid urine is followed by contraction and spasm, and obstruction.

26. I trust you will now entertain no doubt that the apparent changes in the stricture of the urethra are attributable to the disorder of the neighbouring muscles, muscles which surround the stricture, if it be seated within five inches of the bladder. But the subject is further worthy of your utmost attention.

27. There seems to be no stricture without more or less accompaniment of inflammation. This is the reason why strictures are so seldom stationary ; for, being originally produced by inflammation, the continuance of inflammation, even in a slight degree, increases the stricture. This also explains why a stricture becomes progressively worse, and why it returns after the apparent cure of it by the bougie.

28. Of the existence of inflammation in stricture we are informed by the introduction of the bougie : for the stricture, or the

part in the immediate neighbourhood of it, is exquisitely sensible. I need not enter here into the proof that no sensibility exists without increased vascular action. When I pass the ball probe down to the stricture, there is great pain : but, when the ball has passed the stricture, the pain ceases. In bringing the ball back again towards the stricture, the pain is felt as on the first intrusion of it, when it approached the fore part of the stricture. This pain on the back part of the stricture proves that the inflammation attending the disease is in equal degree behind as on the fore part of it. But there is a proof of its being *greater* on the back part than on the anterior part of the stricture ; a fact in which we cannot be deceived, since it is brought to demonstration on the dissection of the parts. I have said, in my first letter, that I have seen, on dissection, inflammation and co-

agulable lymph behind the stricture, when there was none betwixt the stricture and mouth of the urethra ; and when the urethra has been inflamed in all its length, I have found it always most inflamed behind the stricture. When ulceration takes place in a case of stricture, it is behind the stricture, not on the part of the urethra anterior to the stricture. We cannot have a better proof of previous irritation and inflammation than in the formation of an ulcer. Indeed we might *a priori* conclude that, where the difficulty is felt, and the push of urine is made, there would the principal irritation be. The inflammation which, in a lesser degree, produces ulceration behind the stricture, and fistula in perinæo, will sometimes, by a more rapid course, be propagated backwards ; and the distention of the bladder, ureters, and kidneys, and their ineffectual struggles to unload them-

selves, having prepared them for partaking in the same inflammation, the patient is cut off. To understand the symptoms of inflammation, when propagated towards the bladder, ureters, and kidney, ought to be the first object of every one who attempts the cure of diseases of the urethra, and especially by the application of the caustic. He ought to know how caustic will sometimes act like a charm in relieving the complaints concomitant with stricture; how it will, on the contrary, sometimes bring forward the fistula in perinæo, sometimes hasten the death of the patient. I thank God that I have no cases of the latter description to relate from my own practice; but the books on the subject of stricture leave practitioners open to this terrible misfortune, for want (as I take it) of sufficient discrimination in the cases brought forward.

29. To understand the effect of caustic in subduing irritation in the urethra, in cases of stricture, we may take the following conclusive example. If a man has an ulcer in the pellucid cornea of the eye, the ulcer keeps up a great deal of inflammation and irritation in the whole eye ; but if we apply caustic to the bottom and tender part of this ulcer, the irritation and inflammation of the eye quickly subsides. When we examine the circumstances of this case, we find that the ulcer is highly irritable, and that the acrid tears flowing into it are a principal cause of the continuance of the disorder. The touch of the caustic deadens the surface ; then the tears are no longer a cause of irritation, and the general inflammation and pain therefore subside. The effect of the caustic applied to the eye in this manner is however only temporary ; the surface touched by the

caustic is thrown off, and exposes a sensible granulating surface; the tears now having access to this new surface, the pain and irritation return in a certain degree: a second touch of the caustic again destroys the sensible surface, and, before it be again exposed, the hollow of the ulcer is nearly filled up, and a healthy or a more natural state of the part is substituted for the eating sore. Several such gentle applications of the caustic do not prevent the ulcer from filling, and a cicatrix at length forming.

The application of the caustic to the urethra has an effect very similar to this. The stricture is exquisitely sensible, and, when the urine comes in contact with it, there is such an excitement as is necessarily attended with spasm. The first effect of the caustic is to destroy the sensibility, and then the urine passes without exciting

spasm. In explanation of the circumstance that the caustic has not always this effect of subduing spasm and irritability, let me observe to you, what is too little attended to, but which I have no doubt you will at once allow to be just; that, if only the fore part of the stricture is touched by the caustic, the principal source of irritation remaining behind the stricture, the patient will find no relief. You may perhaps say that the caustic is in no instance applied to the back of the stricture, and that still the irritation is subdued. I have little hesitation in answering, that often the caustic does more than the surgeon intends, and that by dissolving and flowing through the stricture it diminishes the sensibility of the surface in the whole extent of the disease.

30. It is manifest that there must be a period after the application of the caustic

when the irritation will return ; and this returning irritation will be in proportion to the severity of the application. In Plate V, we have the appearance of a stricture after the operation of the lunar caustic upon it. In the appearance of the parts from which I took this drawing there were several things worthy of notice. In the first place, behind the stricture we see a very peculiar furrowed appearance : this is owing to a thick layer of coagulable lymph deposited there ; and from the density and pearly whiteness of this portion of the coagulable matter, it must have been deposited before the more extensive accumulation of the inflammatory crust in the bladder and part of the urethra. In the front of the stricture we see the effect of the caustic : the stricture is in part eroded, and delicate fleecy membranes hang from the part, like what we see in a dead ulcer when in ma-

ceration. The stricture is not entirely destroyed; and the flow of the urine must have been as much impeded by the stricture as ever; yet immediately after the application of the caustic the symptoms were remarkably relieved. The patient had suffered long in extreme agony: he at last unwillingly submitted to the application of the caustic; and from its effects we see this application to have been a very effectual one. Where the slough formed in consequence of the application of the caustic has thrown off, and an ulcerated and sensible surface is exposed, there must be a new and aggravating cause of pain and spasm. So in this case, as often it happens, the man at first expressed himself highly delighted with the effects of the operation; but in a few days the spasm was increased in an extraordinary degree, and the whole man became so irritable that he

would allow nothing to be done further.

31. Fistula in perinæo is frequently occasioned, or suddenly brought forward, by the improper use of caustic. A gentleman of rank and talents, which should have secured to him the first advice in the city where he lived, consulted me here in town. He informed me he had a stricture to which the lunar caustic had been applied; and whilst his surgeon was in a course of operations upon him, there came a swelling in the perinæum, which suppurated and formed a fistulous opening. But his surgeon, resolute in his purpose, persevered in the application of the caustic until the stricture gave way, and then the sore in the perinæum healed.

When this gentleman came to me, he was with difficulty conveyed from his carriage; bent with pain, and having a spasm which had prevented the discharge of urine

for twelve hours before. I made him select a bougie of such a size as had been passed formerly : I passed a small bougie with great ease into the bladder. I withdrew it slowly, cast a little cold water on his thighs, when he passed his urine in a tolerable stream.

When I say that I passed the bougie with great ease, I mean to say that there was no resistance to my hand ; but there were great tenderness and pain to the patient. This gentleman was, in short, exactly in the circumstances which precede tumor and suppuration in the perinæum. He said he was afraid there was still a stricture. He complained of shooting pain in the perinæum ; he had a feeling of fulness as if there was a tumour betwixt his thighs ; he had occasional fever and flushing ; he rose often in the night to make water, but sometimes could not make a drop. Had I

in these circumstances applied a large caustic, with the avowed intention of those who have published on the subject, viz. to cauterise and eat away the constricted part of the canal, I should certainly have produced such an aggravation of the irritation behind the stricture as must have terminated a second time in fistula. In such a case the frequent pressure of a bougie would probably have taken off the irritation; but sometimes this practice has an opposite effect, and I did what experience taught me was safe and effectual. I introduced a very small piece of caustic buried in the end of a soft bougie, so that it could effect the stricture only in solution, and not in strength to form a slough. This gave great relief for four and twenty hours. I repeated the application then gently; often at the same time passing the bougie through the stricture, but keeping it only about two

minutes dilating the passage. In a few days the disposition to spasm was entirely done away, and the urethra became so accustomed to the operation, that with perfect safety I could have employed the caustic to the entire destruction of the stricture. But my patient, in the mean time perfectly relieved, went into the country.

32. There occur to my recollection several cases, in which the principle I have laid down may be further illustrated.

There came to me a purser in the navy, who had been long in the West Indies. He was greatly reduced, and had suffered much, as he said, by the ague and fever. The truth was, that he had a very narrow stricture, attended with great irritation in the canal; and, as often happens in these circumstances, there came on frequent paroxysms of fever, with a distinct cold and hot stage. He came home among

kind friends, and to the company of a young wife ; in consequence of which there were several total obstructions. I relieved him by the use of the bougie, leeches, and opiate clysters ; but I could not allay the continual irritation, which appeared to me to be principally seated behind the stricture. At length, this patient, on his going a little way into the country, and neglecting the palliative means by which I hoped to gain upon the stricture, and take off this disposition, produced tumor and fistula in perinæo. I had not at that time ascertained the propriety of the means I have recommended above.

About the same time I succeeded no better with a poor man who was nearly in the same circumstances. I did him so little good, that I set anxiously about the observations which I have in part detailed to you.

33. More lately, a gentleman returned from Madeira, whither he had been sent on account of pulmonary complaints ; and immediately on being settled in his hotel sent for me. He was very ill, and much reduced in flesh and strength ; his water came from him in drops, and his pulse was quick and irritable. He told me that I must not expect to pass a bougie, for the passage would not admit one. The smallest wax bougie could not be passed through the stricture. I however promised him relief. I passed a middle-sized soft bougie into the urethra, and pressed it gently against the stricture. I found the stricture very exquisitely sensible. I continued the pressure some time. I then took a very small catgut bougie, and passed it through the stricture. All this day and the next he had less irritation. I twice repeated this operation, until I found the passage ac-

customed to the bougie, the severity of the symptoms considerably relaxing. I then, on my fourth visit, took a common bougie, and with a pin sunk a hole in the point of it, into which I introduced a very small piece of caustic. I introduced this bougie down to the stricture much in the usual manner. As the caustic dissolved I pressed more forcibly ; when I thought it might be entirely dissolved I withdrew the bougie. " Now," says my patient, " I'll be corked up for these two days." I assured him that he would not suffer ; for I knew that the *solid* caustic had not touched the urethra ; that as it dissolved, my pressure against the stricture squeezed the sides of the little cavity of the bougie together ; and that the dissolved caustic flowed upon the stricture, but not with strength sufficient to produce a slough and consequent swelling of the membrane. The irritation

on this day was in a remarkable degree subdued: the urine flowed in a jet from the penis; and instead of rising four times in the night he had no occasion to rise till the usual hour in the morning. By these gentle means, and the occasional introduction of a bougie, I took off the source of fever in the urinary organs, and left the physician to do his business on the respiratory organs. You may say that in this case the dilatation of the stricture by the catgut bougie was the principal means of relief. Take care how you fall into the belief that you can dilate a stricture of this kind with a catgut bougie. The consequence of the attempt I have seen to be total obstruction, and the death of the patient. If I had used the bougie armed in the usual way, and applied it to this urethra for the space of a minute, I might have had to boast that in three applications the

bougie went into the bladder ; but the probability is fully as great that the patient would have had to submit to have the bladder punctured, or have been in his grave.

I have fixed upon this case, not because it is out of the usual course, but because it is exceedingly common. Another recurs to my recollection, where the symptoms were nearly the same, but where there was a second stricture a short way behind the first. It was in this second stricture that the obstruction was chiefly seated, and there also the principal seat of sensibility was. This sensibility, and consequently the difficulty of voiding the urine, and the spasm, would have increased, if the caustic had been applied in the degree sufficient to have produced a slough on the anterior stricture.

34. There is a period of spasm and irritation when the slightest increase of inflammation will form fistula, or burst the urethra. A domestic of Lord M. came to my house one morning, with great irritation in the urethra, with fulness in the perinæum, and throbbing, and a flushed face. I passed a bougie, ordered him a smart purge and an anodyne clyster, and explained to him his danger. Some days after, I was sent for, and found his scrotum as large as his head: the ulcer behind the stricture had given way, and the urine distended the cellular membrane. I found this man to be a very indispensable person of the establishment, and that whilst in this state of irritation he had cooked a dinner for a great party; soon after which the urine burst into the scrotum. I have perhaps used the term bursting of the urethra improperly, since you know very well that this is the effect of

ulceration, and is often brought suddenly on by excess in wine. It was remarkable in this man's case, that the stricture was by no means of an obstinate kind, and allowed the bougie to pass, and the urine to flow, whilst this ulcer broke out as I have described.

35. I intended to have written a letter, and I have given a long treatise ; but there is one remark more, which I think important. You are aware that I have not been describing the entire manner of destroying stricture, but only treating of that stage and symptom which I think has been so imperfectly explained—the inflammatory and spasmodic state of stricture ; and which, if misunderstood, is so full of danger. The fact to which I allude is this, that whilst I only endeavoured to correct the most urgent symptoms, I sometimes cured the disease ; that by relieving the patient from time to

time I found an unexpected ease in introducing the bougie ; and that by subduing the inflammation, the firmness of the stricture itself gave way.

Fig. 1.

Plate I.



Fig. 2.

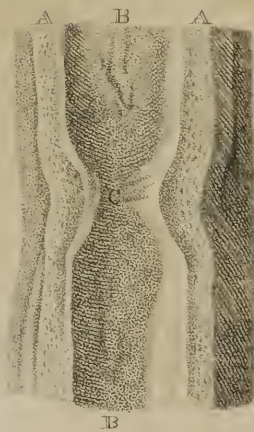


Fig. 1.

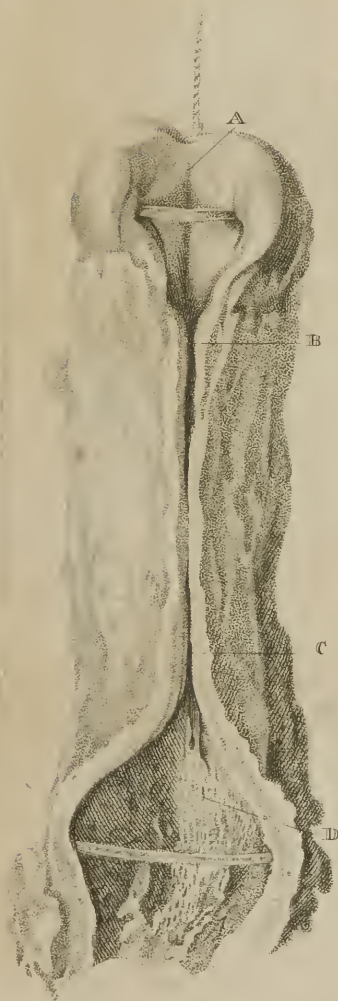


Fig. 2.



Fig. 4.



Fig. 3.



Fig. 1.

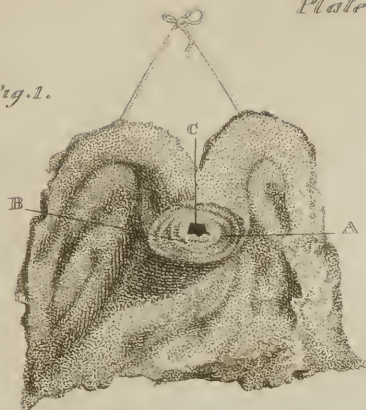
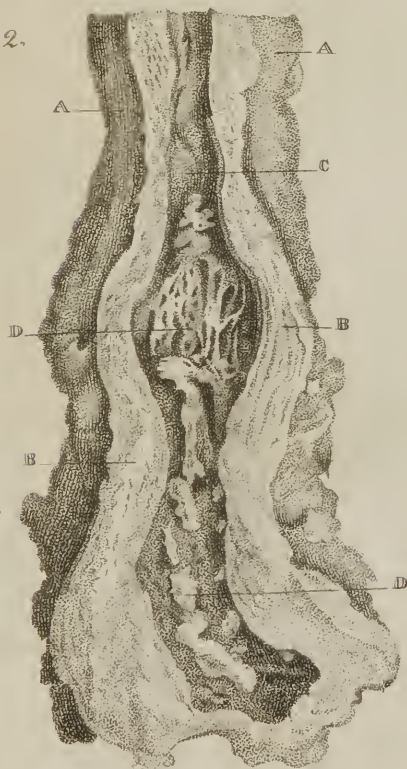
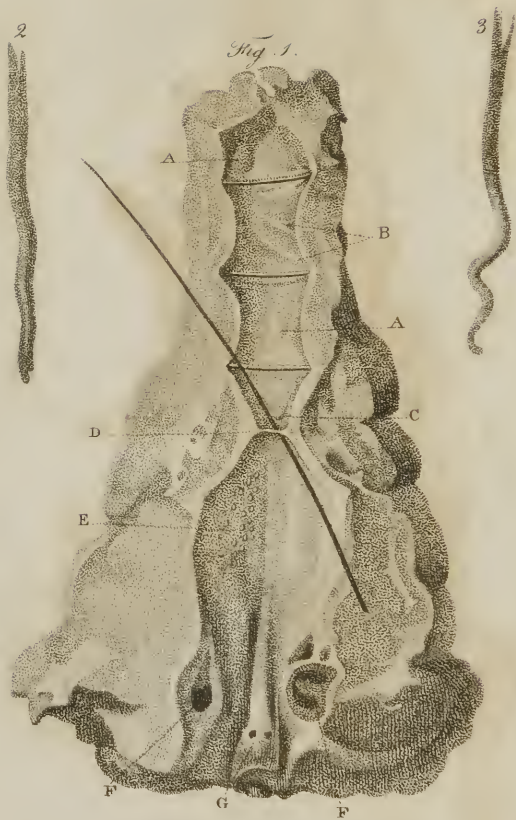
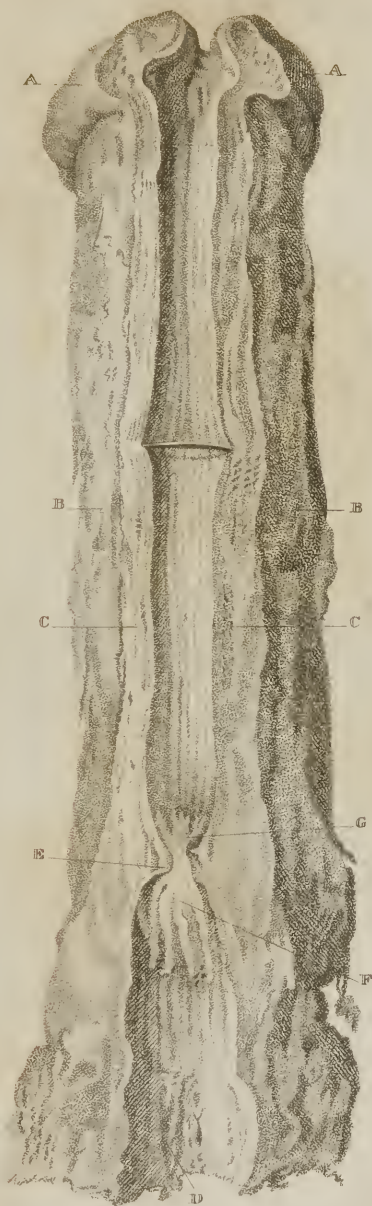


Fig. 2.

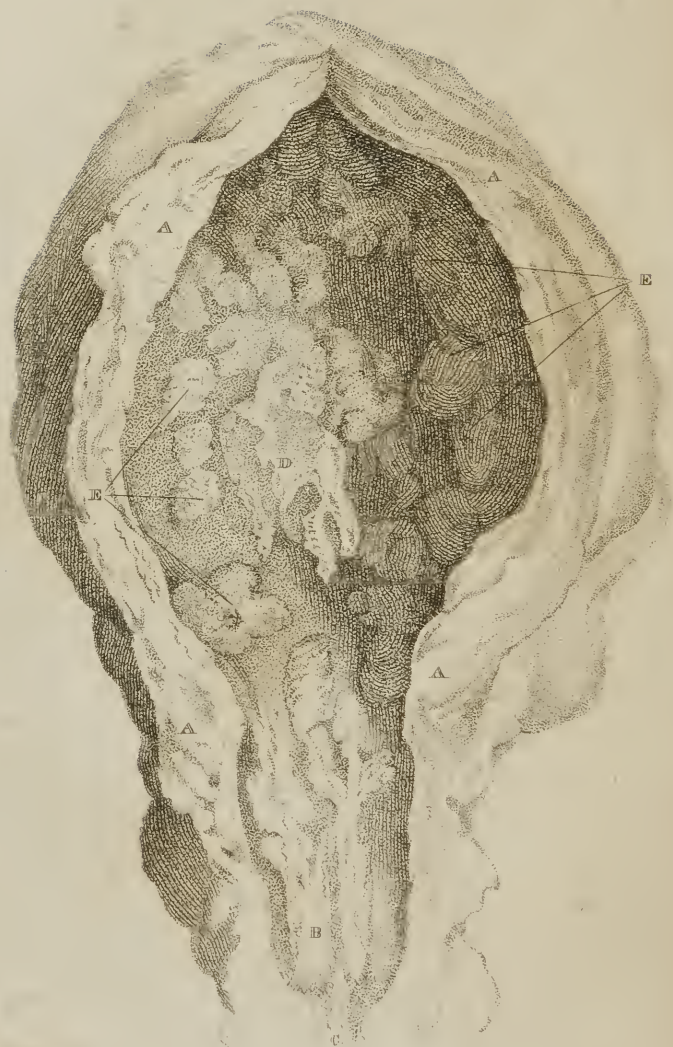






Bell. del^t

Leney, sc!



Bell del^t

Lacey sc^t

EXPLANATION OF PLATES.

PLATE I.

FIG. 1. In this figure is represented a firm stricture with an irregular ulcerated surface. The whole penis is not represented, but only the spongy body of the urethra, and a few inches of the canal.

A A. The corpus spongiosum urethræ.

B. The urethra cut up to show the lacunæ and the stricture.

C. The part of the urethra below the stricture.

D. The stricture with a peculiar reticulated surface, the effect of ulceration.

E E. A callous portion of the spongy body of the urethra. The cells being condensed and closed, and now forming the principal seat of the stricture.

FIG. 2. This figure was taken from Mr. Hunter's work before I had ascertained its incorrectness. I thought that the form of the spongy body at the place of stricture was a consequence of the stricture, but on examining the preparation, I find it to be a pure example of the stricture, by a bridle or small filament, as expressed in plate IV. fig. 1. B.

A A. Corpus spongiosum urethræ.

B B. The internal surface of the urethræ.

C. The stricture.

PLATE II.

FIG. 1. The urethra cut open to shew a long contraction in it, and a wasting of the spongy body.

A. The urethra anterior to the stricture.

B C. The urethra contracted for near three inches in its extent.

D. The urethra very dilatable behind the contraction.

FIG. 2. Urethra sounds of different sizes : the wire is made of silver, and of the length of a common bougie, the ball is rivetted on, a perfect globe, and highly finished ; the balls ought to be of various sizes, from the diameter of the largest to the smallest bougie, but four sizes will generally be found sufficient.

FIG. 3. The urethra sounds having the balls perforated for the lodgement of a small portion of lunar or alkaline caustic.

The intention of this instrument is to introduce the caustic upon the dilatable stricture, or to a common stricture, where the object is to let a certain portion of caustic dissolve and come in contact with the urethra in solution, the advantage of the ball probe or sound, in this case, over the bougie, as employed by Mr. Whately is, that we are better enabled to ascertain the place of the stricture, and therefore to apply the caustic more accurately.

FIG. 4. This is a urethra probe, where, instead of a ball, there is a pyriform knob ; the curve given to the wire enables us to introduce it into the neck of the bladder, and I have used it with much advantage in allaying the irritation at the neck of the bladder ; for this purpose I have gently introduced it along the canal, and then

EXPLANATION OF PLATES.

moved it several times through the further part of the canal.

PLATE III.

FIG. 1. In this rough etching there is represented a stricture of the œsophagus, to shew that the narrowing of the passage was not a consequence of the muscular coat contracting, but a deposition of coagulable lymph betwixt the inner coats: the œsophagus is cut directly across at the contracted part.

A. The muscular coat, or tunica vaginalis gulæ.

B. The thickened internal coats.

C. The passage diminished, so as not to admit a crow quill.

FIG. 2. This represents the effect produced upon the urethra, by a stone sticking in it.

A A. The body of the penis.

B B. The corpus spongiosum urethræ.

C. The place of the urethra in which the round stone stuck.

D D. Shreds of coagulable lymph which were thrown out on all the surface of the urethra, a sufficient proof of the violence of that inflammation, which reaching the bladder, occasioned the patient's death.

PLATE IV.

FIG. 1. This plate represents a considerable portion of the urethra, with its surrounding spongy body and the prostate gland.

A A. The urethra.

EXPLANATION OF PLATES.

- B. Two filaments forming a stricture, which during life powerfully resisted the introduction of a large bougie.
- C. Another stricture of the same kind, behind which there is the appearance of a little sac into which the bougie often hitched.*
- D. Another little cord on the nearer side of the urethra : it will be observed, however, that this cord did not stand across the urethra, as might be imagined from the appearance presented here, it was like B or C ; but to demonstrate the firm nature of it, I cut away the membrane of the urethra.†
- E. Little warty excrescences, which, however, the engraver has but very imperfectly represented, they ought to have been more agminated and prominent.
- F. The ducts of the prostate gland enlarged into great cells, which would very readily receive the point of the largest catheter. Such cavities I believe to be the source of the worst kind of fistula in perinæo.

* This is of the nature of the folds of the membrane of the urethra, resembling the valve of a vein which has been described by Goulard and Desault.

† After much doubt of the accuracy of my first observations regarding the nature of this stricture, and at last having repeated opportunities of satisfying myself, both of its existence and its very frequent occurrence, I find by turning my attention to *Desault traité des Maladies des voies urinaires*, that I might have saved myself any anxiety on this point, for there I find a very accurate description of this obstruction to the urine, ‘*par des brides.*’ But he considers these ligamentous filaments to be an effect of ulceration, condemns the use of the caustic, and recommends the use of the elastic gum bougie.

EXPLANATION OF PLATES.

G. The caput gallinaginis.

FIG. 2. Represents the point of the bougie, as it often appeared when introduced during the patient's life. I saw the danger of forming a false passage in this indication of a sharp line cutting the point of the wax bougie

FIG. 3. The bougie, as it often appeared when withdrawn from the urethra of the same patient. In this case the point had not entered the proper passage, nor struck against the ligamentous filament, but had gone betwixt the filament and the side of the urethra, so as to make a sac (c. fig. 1.) If this had been persevered in, a false passage would inevitably have been formed. To avoid this, I was careful never to allow the bougie to remain, unless the resistance to withdrawing it proved it to be wedged in the proper canal.

The appearance of a valve is probably formed by the point of the bougie pressing betwixt the filament and side of the urethra.

The kali purum was applied three times to this stricture, but no sloughing or erosion, or effect of any kind is apparent.

PLATE V.

This represents the urethra slit up to show the effects of the lunar caustic on stricture.

A A. The glans penis.

B B. The body of the penis.

C C. The spongy body of the urethra.

D. The urethra behind the stricture.

E. The stricture.

EXPLANATION OF PLATES.

- F. Coagulable lymph accumulated behind the stricture, a certain proof of their having been much inflammation there.
- G. Loose shreds of a very fine membrane, where the caustic had been applied. It would appear from this case, that if the proper stricture had been destroyed, still the coagulable lymph accumulated behind, would have been a cause of obstruction to the urine. The inflammation on the part of the urethra behind the stricture, and on the inside of the bladder, produced such irritation that the patient died.

PLATE VI.

This etching represents the effect of stricture on the bladder.

- A A. The walls of the bladder greatly thickened.
- B. Much coagulable lymph behind the stricture of the urethra, and at the neck of the bladder.
- D. Membranes formed of coagulable lymph hanging from the inside of the bladder.
- E E. Firmer masses of coagula attached to the inside of the bladder.

These are sufficient indications of the degree of inflammation and the suffering of the patient. Disease to such an extent as this reduces the patient to a state of irritability that will permit nothing to be done.

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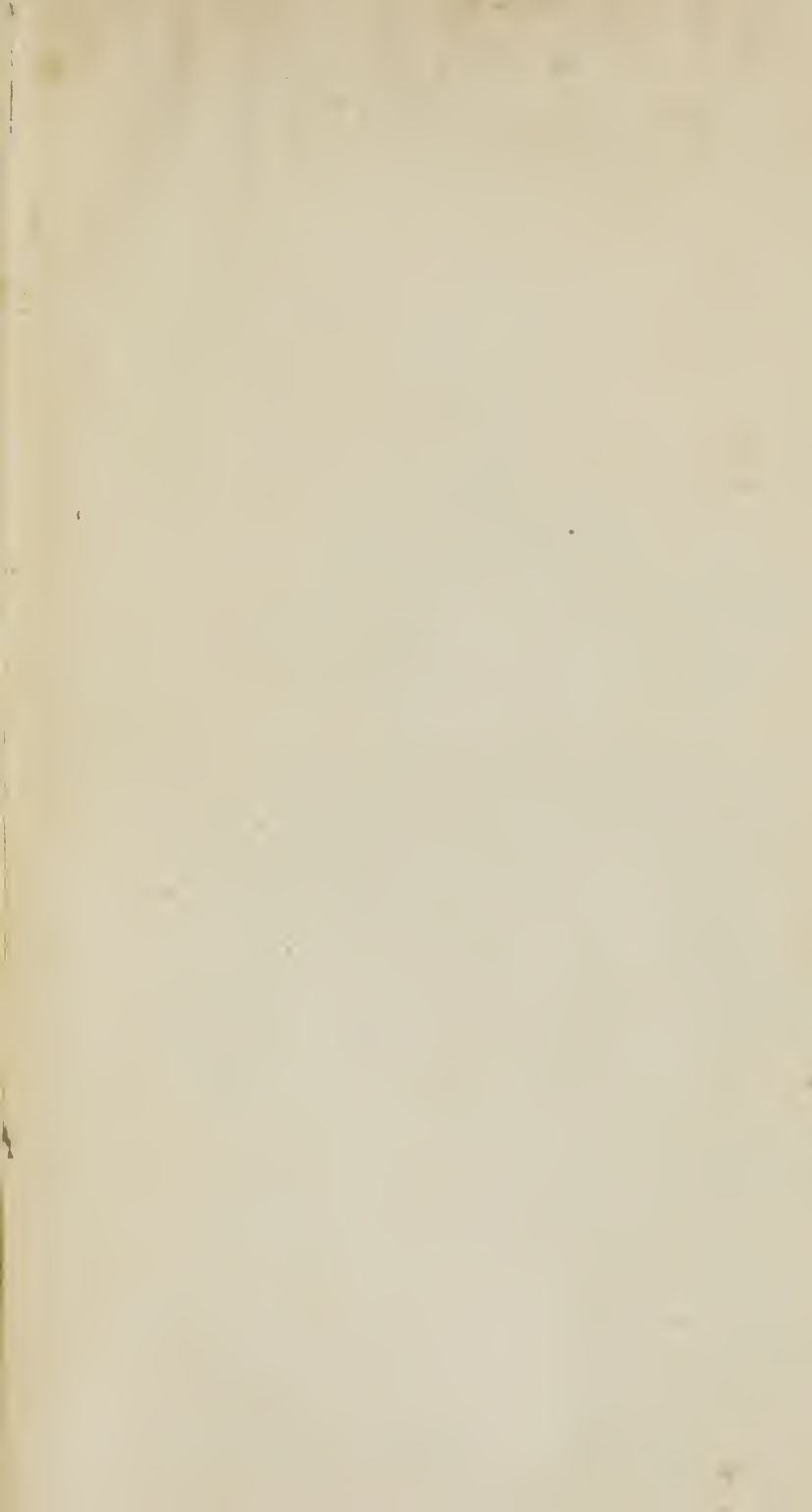
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Boston, October 14, 1809.

From the New York Medical Repository for June and July, 1810.

After quoting Dr. Thacher's Preface entire, and particularly enumerating the number of detached parts of which the Appendix is composed, the Editors say,

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